Illinois Department of
Public Health Presents:

HAZARDOUS CHEMICALS: CLINICAL TIPS

a workshop for
health professionals

November 1991

ILLINOIS DEPARTMENT OF
PUBLIC HEALTH
A Healthier Today For A Better Tomorrow

John R. Lumpkin, M.D., Director

July 17, 1991

Dear Health Professional:

Exposure to hazardous substances or conditions in the home, work place, and environment is of growing concern to citizens, health

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ENVIRONMENTAL TOXICOLOGY PROGRAM

ILLINOIS DEPARTMENT OF
PUBLIC HEALTH

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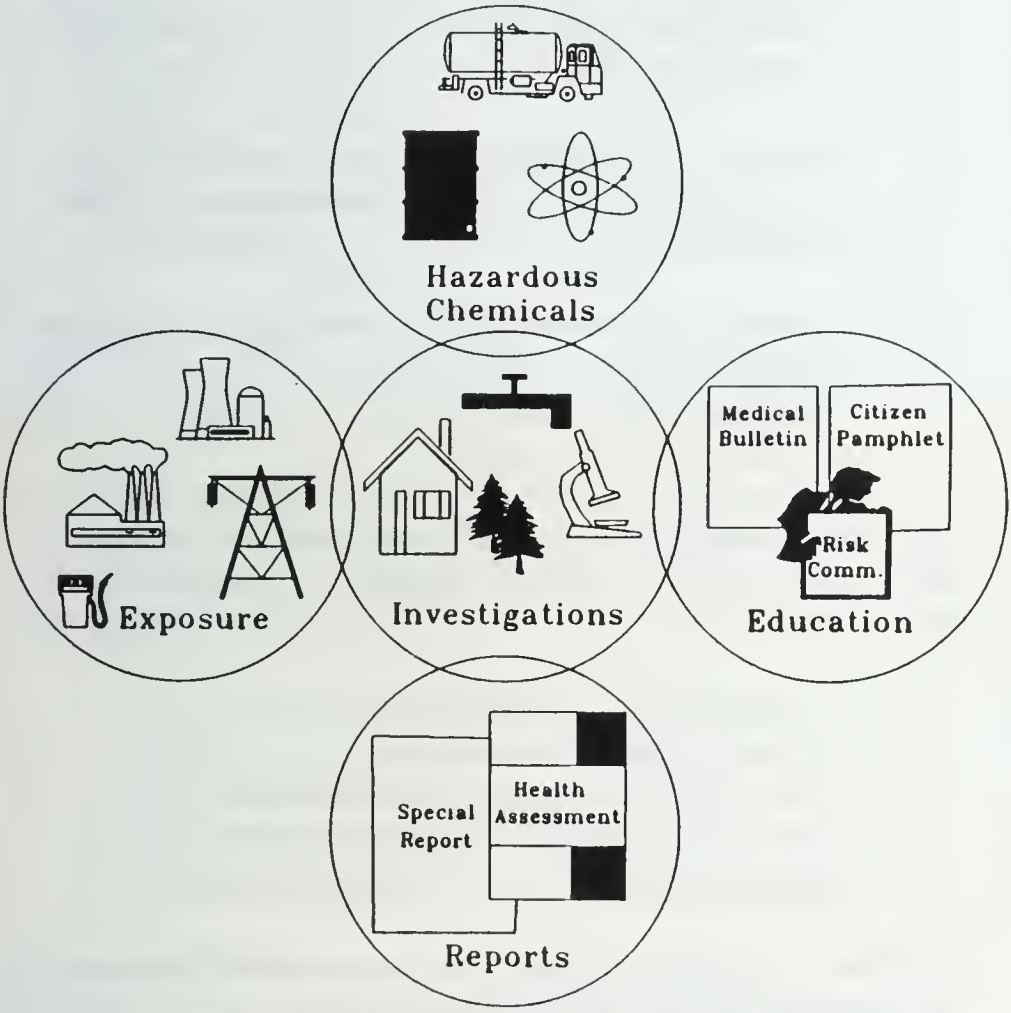
ENVIRONMENTAL TOXICOLOGY PROGRAM



Illinois Department of Public Health

The Environmental Toxicology Program, within the Division of Environmental Health, was created in 1986 to implement the Department's responsibilities under the Environmental Toxicology Act. The primary duties mandated through the Act are to:

- assess the health effects of exposure to hazardous substances or conditions in the home, workplace or environment
- respond to citizen concerns or inquiries about the potential for health problems related to these exposures
- identify actions necessary to mitigate or prevent health effects
- develop health advisories

Staff analyze environmental and biological samples and data to advise individuals or communities of health risks associated with:

- hazardous waste sites
- active industrial operations
- soil, food, water, or air contamination
- acute and chronic chemical exposure
- consumption of fish from Illinois waters

Staff also investigate disease outbreaks and clusters as well as complaints of potentially harmful substances in homes, schools, workplaces, or the environment.

Resource materials are continually being developed to inform the public, health care professionals, and public

health officials about exposure to toxic chemicals in the home, workplace and environment. These materials include:

- medical bulletins on hazardous substances or conditions
- citizen pamphlets on hazardous substances or conditions
- hazardous waste site summary pamphlets
- audio-visual aids
- public health workshops focusing on areas of environmental concern
- comprehensive reports on environmental issues

These materials are available upon request from any of the offices listed on the following page. Staff members are also available as speakers and facilitators upon request.

The staff of the Environmental Toxicology Program consist of toxicologists in the central office as well as in each of the regional offices. The training and experience of these professionals include:

- environmental and medical toxicology
- industrial hygiene
- environmental and occupational health
- veterinary toxicology
- poison control and pharmacology/toxicology

Regional staff perform most field investigations, in conjunction with local health departments, with consultation available from the central office staff. Telephone numbers for the central and regional offices are listed on the following page.

ILLINOIS DEPARTMENT OF PUBLIC HEALTH

DIVISION OF ENVIRONMENTAL HEALTH

ENVIRONMENTAL TOXICOLOGY PROGRAM

REGION 1
4302 North Main Street
Rockford, IL 61103
(815) 987-7511

REGION 2
5415 North University
Peoria, IL 61614
(309) 693-5360

REGION 3
4500 South 6th Street
Springfield, IL 62703
(217) 786-6882

REGION 4
#22 Kettle River Drive
Edwardsville, IL 62025
(618) 656-6680

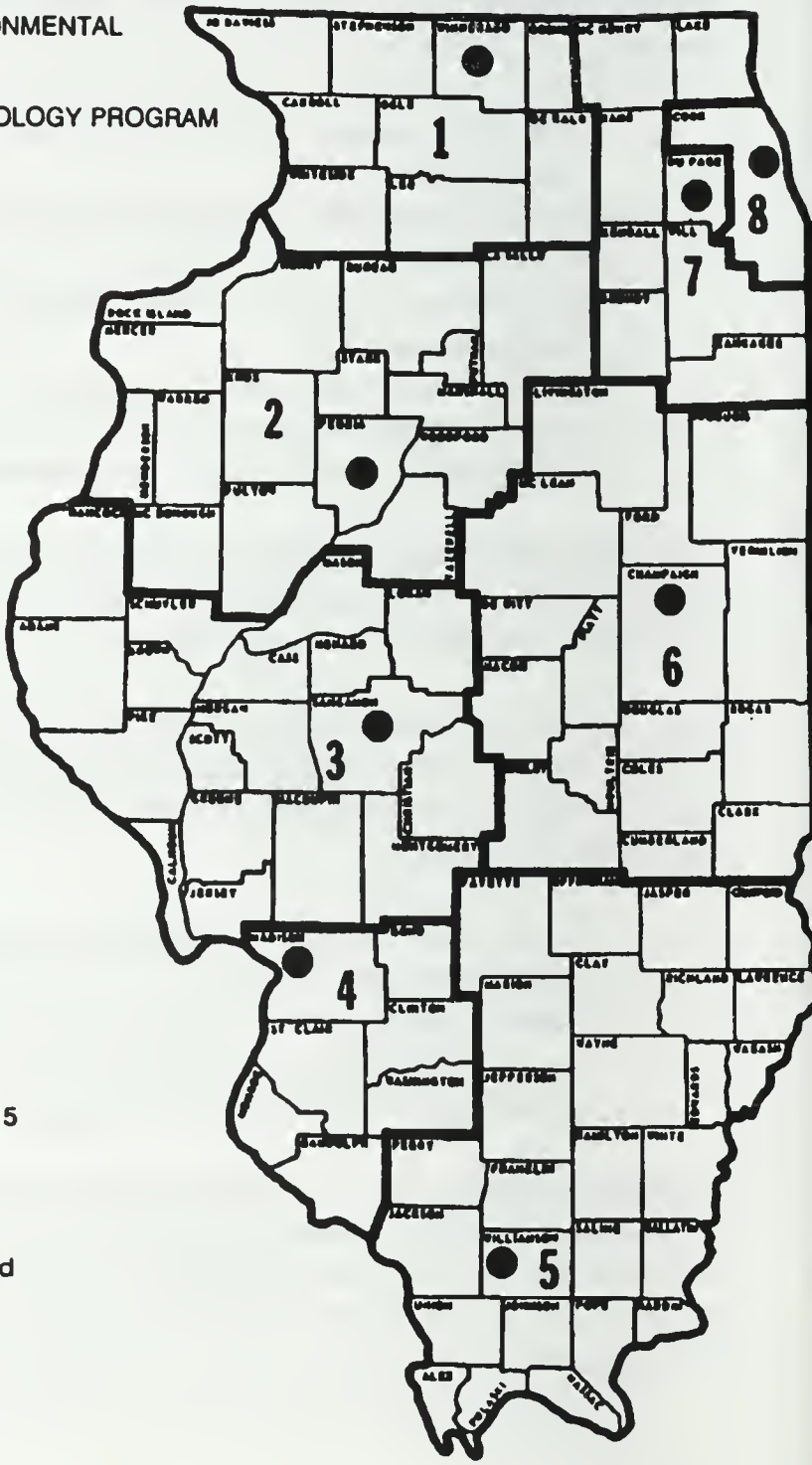
REGION 5
2309 West Main Street
Marion, IL 62959
(618) 997-4371

REGION 6
2125 South First Street
Champaign, IL 61820
(217) 333-6914

REGION 7
245 Roosevelt Road, Bldg. 5
West Chicago, IL 60185
(708) 293-6800

REGION 8
4212 West St. Charles Road
Bellwood, IL 60104
(708) 544-5300

CENTRAL OFFICE
525 West Jefferson Street
Springfield, IL 62761
(217) 782-5830



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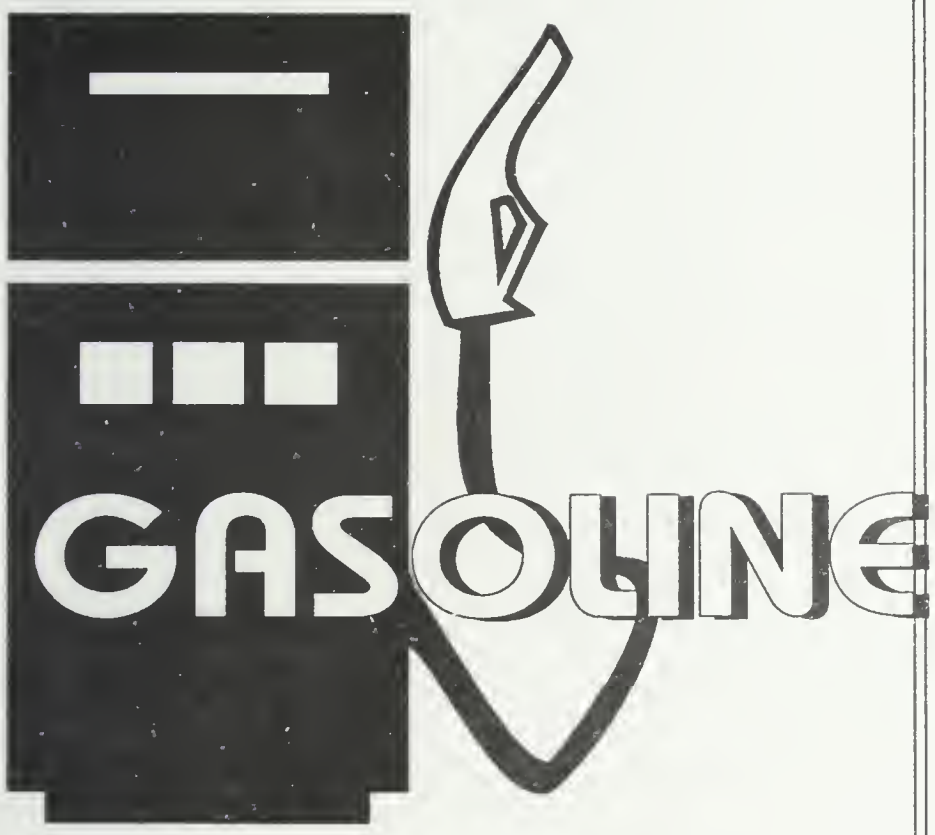
ENVIRONMENTAL HEALTH FACTS



Illinois Department of Public Health

Developed through a Cooperative Agreement with
Agency for Toxic Substances and Disease Registry

WHAT IS GASOLINE?

Gasoline is a mixture of many similar hydrocarbon (carbon- and hydrogen-containing) compounds obtained from refining crude oil. Gasoline hydrocarbons are generally divided into three groups according to structural similarities which influence chemical and physical properties. These three groups, alkanes, alkenes, and aromatics, are described in Table 1 along with some specific hydrocarbons present in gasoline mixtures and average concentrations.

Table 1. Hydrocarbons in Gasoline (percent of total mixture)

ALKANES: carbon atoms joined by single bonds in straight chains (alkanes), branched chains (isoalkanes), or ring structures (cycloalkanes). Alkanes account for approximately 62% of gasoline mixtures.			
butane	4.8%	pentane	3.6%
hexane	1.7%	isobutane	1.1%
isopentane	10.3%	methylcyclopentane	1%
ALKENES: carbon atoms joined by one or more double bonds into straight or branched chain molecules. Alkenes account for approximately 7% of gasoline mixtures.			
t-2-butene	.5%	t-2-pentene	.6%
AROMATICS: carbons joined together in a ring structure containing 1 or more double bonds. Aromatics account for approximately 31% of gasoline mixtures.			
benzene	1.7%	ethylbenzene	1.7%
toluene	4%	xylenes	8.5%

A typical gasoline mixture contains about 150 different hydrocarbons. Gasoline mixtures are varied (blended) to accommodate external conditions such as climate and elevation.

Gasoline also contains a number of additives and blending agents to increase its stability and efficiency, and meet

performance standards (Table 2). These compounds are usually present in only very small amounts.

Table 2 Gasoline Additives

ADDITIVE	FUNCTION	COMPOUND
anti-knocking agents	improve efficiency of gasoline and reduce engine wear	- methyl tert-butyl ether - 2,2,4-trimethylpentane - tert-butyl alcohol - tetraethyl lead
anti-oxidants	prevent gum formation	- p-phenylenediamine - aminophenols
lead scavengers	enhance performance of unleaded gasoline	- ethylene dibromide - ethylene dichloride
anti-rust agents	help eliminate corrosion due to water	- fatty acids amines - sulfonates
anti-icing agents	minimize stalls before engine is hot	- alcohols - glycols - amines - organophosphate salts
upper-cylinder lubricants	reduce engine wear	- cycloparaffinic distillates
detergents	prevent dirt buildup	- amino hydroxy amide
dyes	identify product grade	- red - orange - yellow - blue

The use of lead compounds as anti-knocking agents in gasoline mixtures began in the early 1920s. In 1975, however, these compounds began to be phased out of gasoline in the United States because of air pollution concerns. Specific hydrocarbons (e.g. branched alkanes and aromatics) as well as alcohols (e.g. tert-butyl alcohol) and ethers (e.g. methyl-tert-butyl ether) have replaced lead as anti-knocking agents. Although leaded gasoline is not available in urban areas of the United States, it is still used for agricultural equipment in some rural areas and in other

countries throughout the world. Trace concentrations of various other metals are also present in most gasoline mixtures. These are usually present in crude oil before refining begins.

HOW DOES GASOLINE GET INTO THE ENVIRONMENT?

Gasoline is a highly volatile liquid which is extremely mobile in the environment. As a result, spills, leaks, or improper disposal can contribute to contamination of surface and subsurface soils, and degradation of ground and surface waters. A leaking storage tank or pipeline can cause contamination of surrounding soil and underlying groundwater. Vapors from subsurface contamination can, in turn, rise to the surface and result in contamination of both indoor and outdoor air. Groundwater provides recharge to drinking water wells or surface waters (rivers and lakes), which may become contaminated as a result. There are approximately 1.4 million underground gasoline storage tanks in use in this country; of those 10 percent to 35 percent are estimated to leak or fail to meet holding integrity regulations. Other potential sources of gasoline release to the environment include loss during refining, transport and retail purchase, vehicular emissions, or improper disposal.

HOW CAN I BE EXPOSED TO GASOLINE?

Exposure to gasoline can occur through several different pathways:

A. Breathing air contaminated with gasoline vapors: Hydrocarbons evaporate readily into the air from gasoline or contaminated soil or water. Gasoline vapors can accumulate

in basements, crawlspaces, and living areas and present an inhalation hazard. At very high levels, a hazard of an explosion may also exist. Vapors can migrate into these areas from contaminated groundwater or soil underneath or around the home.

Substance abuse associated with gasoline sniffing or inhaling vapors is also a well documented public health concern and has resulted in death or permanent damage to health.

B. **Drinking gasoline contaminated water or ingesting food cooked with contaminated water:** Studies have also shown the presence of gasoline constituents in the breast milk of exposed women. This suggests that nursing mothers may expose their infants to contaminants through this means.

C. **Physical contact with gasoline (i.e. pumping gas, cleaning a gasoline spill, etc.) or contact with contaminated soil or water:** Gasoline constituents may be absorbed through the skin during any contact with gasoline or water or soil contaminated with gasoline constituents.

IS GASOLINE HARMFUL TO MY HEALTH?

Health effects due to exposure to gasoline (inhalation, ingestion, and dermal absorption of gasoline or gasoline contaminated materials) may be divided into acute (short-term) and chronic (long-term) effects. Acute effects result from a short exposure (minutes to hours) to high levels of a compound, while chronic effects most often result from a much longer exposure (months to years) to lower levels. Acute effects are usually associated with occupational exposure, substance abuse (i.e. sniffing gasoline), or accidental releases or spills of large amounts of gasoline. Chronic effects are usually associated with long-term

exposure to lower levels in the workplace, home or environment, or substance abuse.

ACUTE EXPOSURE

ACUTE - INHALATION - Acute exposure to gasoline vapors can result in the following health effects (symptoms are listed in general order of appearance and severity, and reflect the effects of increasing dose and duration of exposure): nose and throat irritation, headaches, dizziness, nausea and vomiting, confusion, reduced ability to concentrate, heart irregularities, difficulty breathing, cyanosis (lack of oxygen in the blood), chemical pneumonia (fluid in the lungs), pulmonary edema (swelling of lung tissue due to fluid accumulation), stupor, and coma. Death or permanent organ damage has resulted in extreme cases associated with exposure to high concentrations of gasoline vapors in confined, unventilated areas such as storage tanks. This damage may include injury to the nervous system, lungs, liver, kidneys, and heart. Exposure to gasoline vapors in outdoor air is generally at lower levels and has not demonstrated the same effects.

ACUTE - INGESTION - Ingestion of gasoline accounts for a large percentage of all accidental poisonings each year. Symptoms include irritation or injury to mouth, throat, and stomach; nausea and vomiting; headaches; dizziness; stupor; heart irregularities; chemical pneumonia; cyanosis; and coma. Death has resulted from ingestion of relatively small amounts of gasoline; however, recovery is possible with prompt treatment. Damage to the nervous system, lungs, liver, kidneys, and heart has also been demonstrated and may be persistent. Although low levels of gasoline are sometimes found in drinking water, acute symptoms are unlikely to occur in individuals exposed through drinking contaminated water or eating food cooked in contaminated

water. The taste and odor threshold of gasoline and its components are very low. This may render the water or food unpalatable even though health concerns may be minimal.

ACUTE - DERMAL ABSORPTION - Very little information is available on the acute dermal effects of gasoline exposure in humans; however, studies have shown that various hydrocarbons are readily absorbed by the skin. Dermal exposure to gasoline has resulted in irritation, dermatitis, redness, and swelling of skin and mucous membranes.

CHRONIC EXPOSURE

Interpretation of the few human studies to determine the health effects of chronic exposure to gasoline is complicated by the extreme variation of mixtures and blends. However, many studies have been conducted on chemicals common to all gasoline mixtures. Health outcome data from these studies are used to estimate the potential for health effects from chronic exposure to gasoline. The four most thoroughly studied chemicals common to all gasoline mixtures are benzene, toluene, ethylbenzene, and xylene (BTEX). While the relative concentrations of BTEX in gasoline mixtures are very low (Table 1), they are among the most toxic constituents.

Workers chronically exposed to BTEX or other gasoline constituents via inhalation reported neurological deficiencies such as impaired performance on tests for intellectual and motor ability, muscular function, memory, and visual and verbal acuity. There is also evidence of kidney disfunction in workers exposed to low levels of BTEX in the workplace for extended periods of time. Other studies of similarly exposed human populations have also shown a possible correlation

between exposure to some gasoline constituents in air and adverse reproductive and developmental effects.

Studies of human populations exposed to gasoline through breathing contaminated air or from direct skin contact with gasoline have provided mixed evidence for an increased risk of cancer. Benzene has been shown to cause cancer (leukemia) in laboratory animals exposed to high levels and in chronically exposed workers. Long-term exposure to benzene via inhalation has also resulted in other blood disorders (aplastic anemia). Research to date has not demonstrated that toluene, ethyl benzene, and xylene are animal or human carcinogens. However, because of the ability of benzene and other gasoline constituents to induce cancer in humans and animals, and the uncertainty over the long-term effects of low-level exposure in humans of other gasoline constituents, gasoline exposure is considered a potential cancer risk.

IF I HAVE BEEN EXPOSED TO GASOLINE SHOULD I CONSULT MY PHYSICIAN?

There are currently no medical tests to predict health effects of exposure to gasoline. Although there are some tests available to measure the amounts of chemicals in the blood or urine, no accurate correlation between test results and potential health effects can be made at this time. At best, the tests may only be able to tell you if you have been exposed to the chemical. **However, if you suspect you are ill because of exposure to gasoline, consult your physician immediately.** Be prepared to tell your doctor what you suspect the contaminant to be, why you suspect this contaminant, and the specific symptoms you are experiencing. You can also ask your doctor to contact the Illinois Department of Public Health (IDPH) for consultation

regarding available and validated environmental and medical tests and interpretations of environmental analyses or medical tests.

IS THERE A SAFE LEVEL FOR GASOLINE CONSTITUENTS IN MY WATER?

There are currently no standards for regulating levels of these chemicals in private wells. However, the United States Environmental Protection Agency (USEPA) has established Maximum Contaminant Levels (MCLs) for public water supplies to reduce the chances of adverse health effects due to contaminated drinking water (Table 3). These standards are well below levels for which health effects have been observed. The MCLs are enforceable limits that public water supplies must meet. The USEPA has not established MCLs for all gasoline constituents.

Table 3. MCLs FOR GASOLINE CONSTITUENTS

[in parts per billion (ppb) or micrograms per liter (ug/l)]

CHEMICAL	MCL	CHEMICAL	MCL
benzene	5	ethylbenzene	700
toluene	1,000	xylene	10,000

If your water exceeds one of the MCLs, it does not necessarily mean that the water will make you sick. It is important, however, to reduce the levels of these chemicals in drinking water if they exceed the MCLs. If you are on a public water system that is contaminated, the Illinois Environmental Protection Agency (IEPA) requires that the water be brought into compliance with the MCLs within a reasonable period of time. Public supplies are regularly

tested by IEPA to ensure water quality. Test results are available through IEPA.

If you have a private well that you suspect may be contaminated, you should follow the advice of your state or local health department to get the water tested and the results interpreted. This may include the recommendation that you discontinue use of your water altogether if contamination is high or follow some simple steps to reduce exposure if the contamination levels are low or until a permanent solution can be found. The following are temporary steps you can take to reduce your exposure whether the contamination is in public or private water supplies.

1) Shower or wash in cooler water. Wash and rinse clothes in cold water. The hotter the water, the more readily these chemicals evaporate from the water into the air you breathe.

2) Ventilate bathrooms, washrooms, and kitchens during and after water use.

3) Use less water; for example, take shorter showers and substitute showers for baths, and use shorter wash cycles for dishes and clothes.

4) Substitute tap water with bottled water.

5) If on a private water supply, consider connection to a regulated public water supply.

6) Consider instillation of in-home treatment. For resources about in-home water treatment units contact the Illinois Department of Public Health (see back cover).

IS THERE A SAFE LEVEL OF GASOLINE IN THE AIR I BREATHE?

Gasoline and most of its constituents have a very low odor threshold: their presence is quite noticeable at levels lower then those usually associated with adverse health effects. In general, there are no established limits for exposure to gasoline vapors in residential indoor air. IDPH can evaluate instances of gasoline vapors in household air and provide health based recommendations. The Clean Air Act and Illinois Air Toxics Regulations mandate limits on gasoline constituents in outdoor air. In the workplace, limits have been placed on the levels of gasoline or its constituents to which the majority of workers may be safely exposed during the workday. Table 4 presents workplace standards for gasoline and its constituents with odor thresholds for comparison.

Workplace limits are set for 40 hour work weeks with healthy adults in mind and are not generally useful for assessing residential exposure. With appropriate modifications, however, they may be useful guidelines for residential exposure.

Because gasoline is a volatile liquid, it can be an explosion hazard when mixed with air. A gasoline/air mixture can be ignited if the concentration exceeds the lower explosive limit (LEL) and does not exceed the upper explosive limit (UEL). For gasoline, this range is 1.4 percent to 7.6 percent. While this level is much higher than the odor threshold and would be very irritating to exposed individuals, basements can accumulate explosive levels in some circumstances without residents being aware of the problem since the vapor is heavier than air and will accumulate close to floors. Ignition sources like furnaces or water heaters may touch off fires or explosions in such instances.

Table 4. Workplace Standards vs. Odor Thresholds

COMPOUND	ODOR THRESHOLD mg/m^3	WORKPLACE LIMIT mg/m^3	IMMEDIATELY DANGEROUS TO LIFE AND HEALTH mg/m^3
gasoline	0.015-30.0	900.0	not available
benzene	4.5-390.0	32.0	9,750
toluene	0.08-268	377.0	7,660
ethyl benzene	0.4-880	434.0	8,820
xylene	0.22-880	434.0	4,410
hexane	233-888	176.0	17,900
heptane	2.1-1,372	1,640.0	20,850
octane	2.4-1,116	1,400.0	23,750
nonane	0.5-220	1,050.0	not available
cyclohexane	0.35-1,050	1,030.0	35,000

American Conference of Governmental Industrial Hygienists, Threshold Limit Values and Biological Exposure Indices for 1990-1991, ACGIH, Cincinnati, OH.

Since most gasoline vapors enter homes from below ground or through sewers, it is important that these sources be investigated. Cracks in basement walls or floors should be sealed, drain traps should be installed and/or not allowed to become dry, and sumps should be covered and/or sealed. Increasing ventilation in basements or crawl spaces can also be an effective means of vapor control. Window and ceiling fans can aid proper circulation along with appropriately maintained heating, ventilation, and air conditioning units. In extreme cases, charcoal filters installed in ducts or forced

air vents can reduce or eliminate odors. Filters need to be changed on a regular basis.

An explosimeter can be used to determine whether an explosion hazard exists. Most fire departments and other emergency response agencies possess these devices. Other direct reading instruments such as an Organic Vapor Analyzer (OVA) can provide instantaneous measures of total organic vapors in the air, but cannot identify the individual components or the relative proportions. Specific compounds must be identified using specialized sampling equipment and analyses. Most often this involves active or passive collection of vapors on activated charcoal with subsequent laboratory analysis. Consult IDPH, IEPA, the State Fire Marshall, your local health department, or private laboratories about the need for air sampling and the most appropriate procedure(s). Laboratories conducting air analyses should be certified to perform such analyses.

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ENVIRONMENTAL TOXICOLOGY PROGRAM

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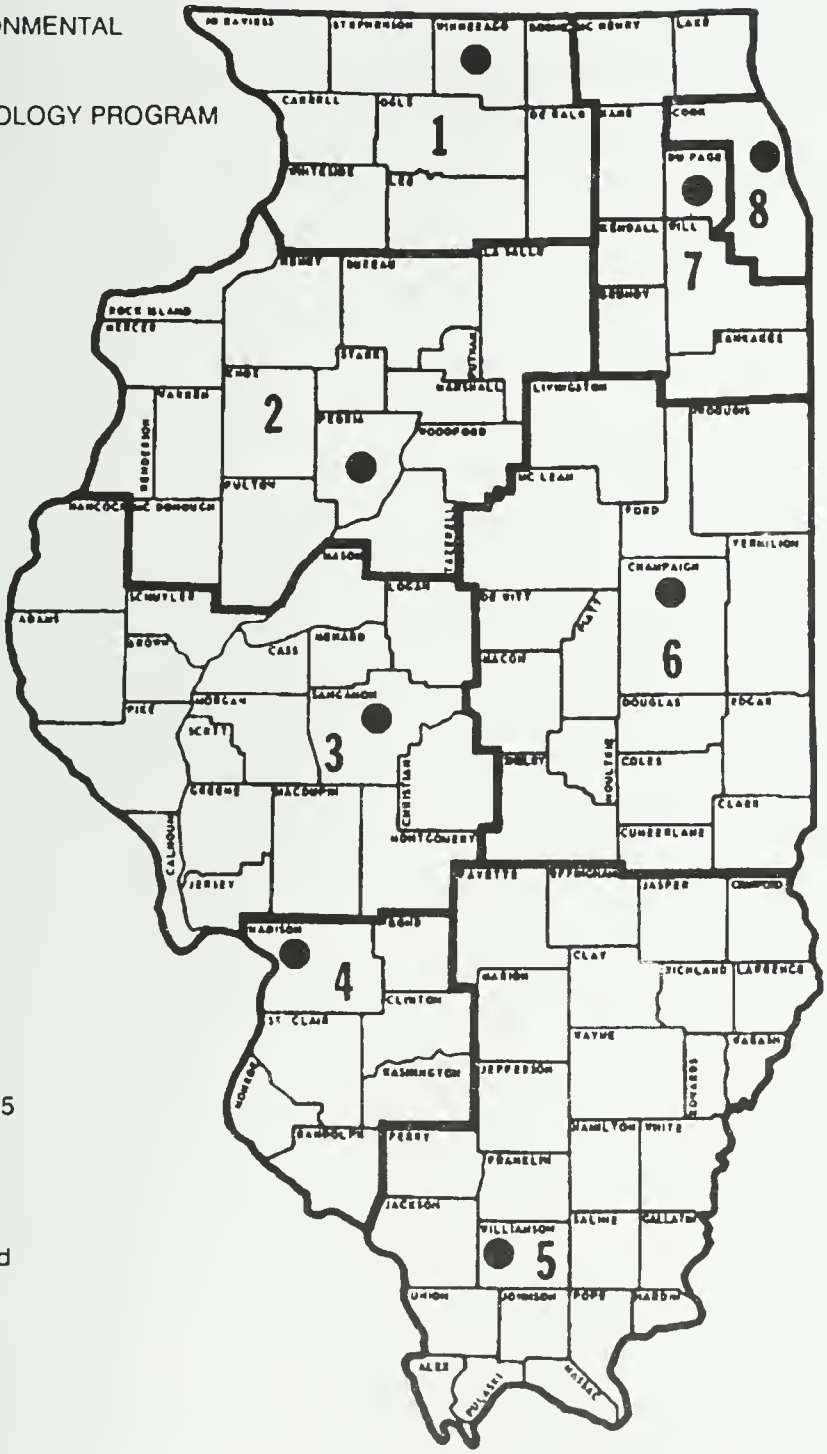

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ILLINOIS DEPARTMENT OF
PUBLIC HEALTH
A Healthier Today For A Better Tomorrow

John R. Lumpkin, M.D., Director

July 17, 1991

Dear Health Professional:

Exposure to hazardous substances or conditions in the home, work place, and environment is of growing concern to citizens, health care professionals, and public and environmental health professionals alike. The purpose of this letter is to notify you of an information service that may be of help.

The Illinois Department of Public Health (IDPH), in cooperation with the federal Agency for Toxic Substances and Disease Registry (ATSDR), is developing informational materials on exposure to hazardous substances or conditions. I believe these will be helpful for the primary care physician, nurse, and other health care professionals; public health officials; and environmental health professionals confronted with health questions or problems relating to possible environmental or occupational exposures.

The following will be available through this program:

1. Chemical-specific Medical Bulletins -

   Each bulletin will discuss potential sources of exposure, clinical toxicology, and diagnosis and treatment of a specific compound that may be encountered in the home, work place, or environment. Initial offerings will cover certain heavy metals, pesticides, and solvents.

2. Concept-specific Medical Bulletins -

   These bulletins discuss broader issues such as the basis of concern, theory, and rationale of regulatory or medical intervention, and criteria for initiating further study. They will cover such subjects as air pollution and health, reproductive hazards, disease clustering, pesticides in food, and chemical hypersensitivity.

3. Chemical- or Concept-specific Citizen Pamphlets -

   These pamphlets are designed to inform the general public about the hazardous substances or conditions which may affect them. Chemical pamphlets discuss general information about a specific chemical, exposure routes, health effects, and ways to minimize exposure. Concept-specific pamphlets cover such subjects as indoor air pollution, safe drinking water, soil contamination by chemicals, and leaking underground storage tanks.

535 West Jefferson Street • Room 500 • Springfield, Illinois 62761
100 West Randolph Street • Suite 6-600 • Chicago, Illinois 60601

4. Site-specific Medical Bulletins -

Each health bulletin will discuss the health risks associated with specific hazardous waste sites, industrial operations, or exposures unique to a community. Each discusses the background, chemicals, exposure pathways, and possible medical complications or health risks associated with such sites. You may request information on any site or community in Illinois.

5. Case Studies in Environmental Medicine -

These are self-instructional publications on hazardous substances in the environment, to aid in the evaluation of potentially exposed patients. ATSDR and the Centers for Disease Control (CDC) have designated these for Continuing Medical Education (CME) credits as well as Continuing Education Units (CEU) for other health professionals.

6. Audiovisual Materials -

Audiovisual materials, intended for the health care (or public or environmental health) professional will be made available for meetings, hospitals or clinics, or to individuals.

7. Workshops and Seminars -

IDPH will be developing and offering workshops on issues involving environmental health. CMEs and CEUs will be available for those who attend. Professional staff are also available to speak at meetings or to professional groups on various topics.

8. Consultation, Information Retrieval, and Referral -

Department staff with training in various fields of toxicology are available to discuss patient concerns regarding issues of exposure to potentially hazardous compounds or situations, or to locate and provide information on subjects of concern. The health care professional also can confer with staff of ATSDR, CDC, and other agencies. IDPH will also provide referrals to physicians specializing in occupational and environmental medicine upon request.

This department is committed to alerting health care professionals, public health officials and environmental professionals to environmentally-related health concerns and providing the most current information available. I encourage you to take advantage of these resources, and to suggest others according to your particular needs.

Please return the enclosed postcard with your preferences checked to help us develop our mailing list. If you have any questions, comments, or suggestions, please contact Sharron LaFollette, Ph.D., or Ken McCann, in the IDPH Division of Environmental Health at (217) 782-5830.

Sincerely,

John R. Lumpkin, M.D.
Director of Public Health

Enclosure

ATSDR

The Agency for Toxic Substances and Disease Registry (ATSDR) is a federal public health agency located in Atlanta, Georgia. It is part of the Public Health Service within the U.S. Department of Health and Human Services. Created by Superfund legislation in 1980, ATSDR has a mission to prevent or mitigate adverse human health effects and diminished quality of life resulting from exposure to hazardous substances in the environment. To carry out this mission and serve the needs of the American public, ATSDR conducts activities in the following areas:

- ✓ **PUBLIC HEALTH ASSESSMENTS** - evaluate data and information on the release of hazardous substances into the environment to 1) assess any current or future impact on public health, 2) develop health advisories or other health recommendations, and 3) identify studies or actions needed to evaluate and mitigate or prevent human health effects. ATSDR conducts health assessments for all waste sites on the National Priorities List and in response to petitions from concerned individuals or organizations.

- ✓ **HEALTH INVESTIGATIONS** - increase our understanding of the relationship between exposure to hazardous substances and adverse human health effects, through epidemiologic, surveillance, and other studies of toxic substances and their effects.

- ✓ **EXPOSURE AND DISEASE REGISTRIES** - establish and maintain a registry of persons exposed to hazardous substances and a registry of serious diseases and illnesses in persons exposed to hazardous substances in the environment.

- ✓ **EMERGENCY RESPONSE** - provide health-related support to states, local agencies, and health care providers in public health emergencies that involve exposure to hazardous substances, including health consultations on request and training for first responders.

- ✓ **TOXICOLOGICAL PROFILES** - summarize and make available to the public data on the health effects of hazardous substances, identify significant gaps in knowledge, and initiate research in toxicology and health effects where needed.

- ✓ **HEALTH EDUCATION** - develop and disseminate, to physicians and other health care providers, materials on the health effects of toxic substances; establish and maintain a publicly accessible inventory of hazardous substances; and maintain a list of sites closed or restricted to the public because of contamination by hazardous substances.

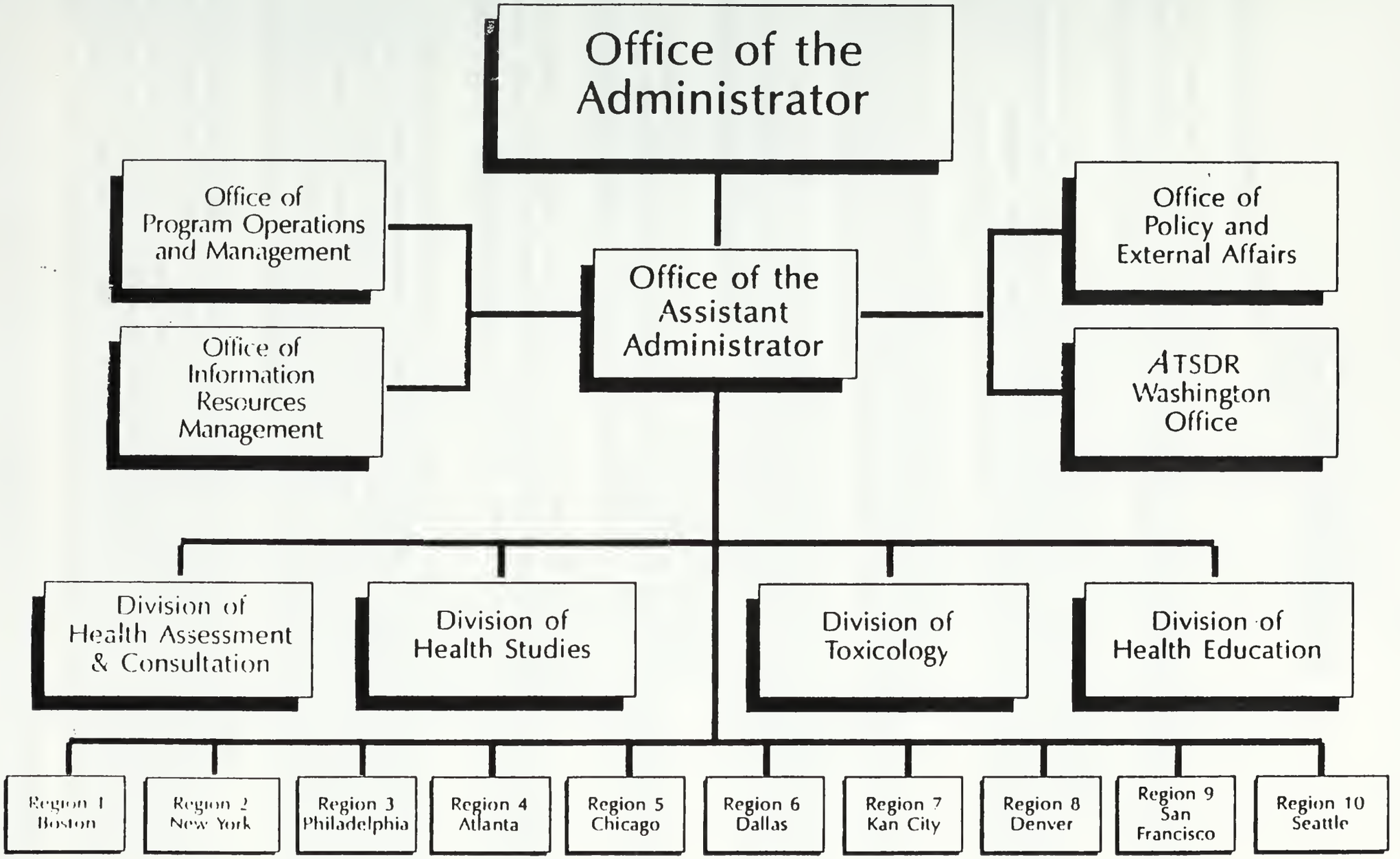
- ✓ **APPLIED RESEARCH** - conduct or sponsor research to increase scientific knowledge about the effects on human health of hazardous substances released from waste sites or of other releases into the environment.

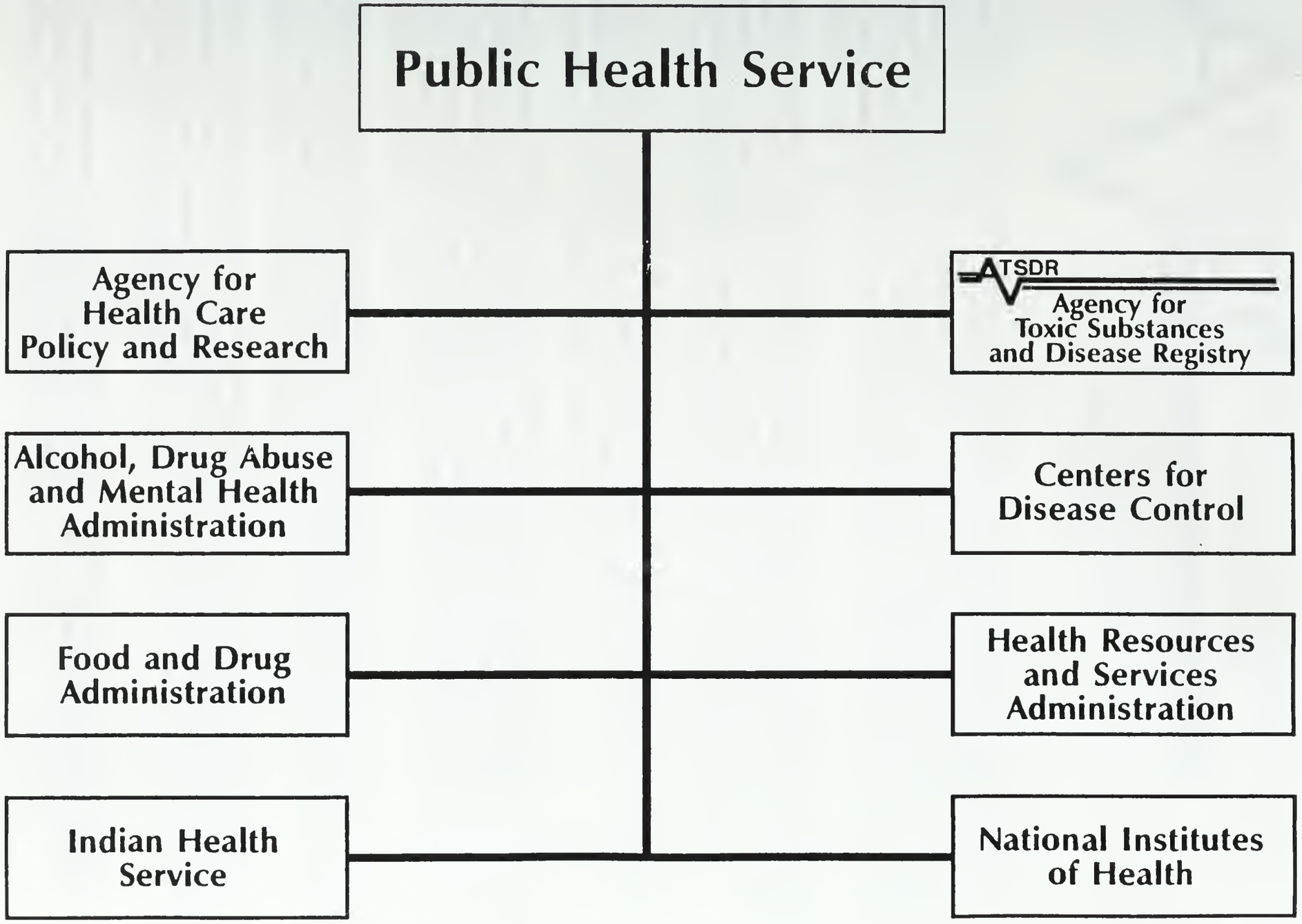
For more information, contact:

ATSDR
1600 Clifton Road, N.E. (E-28)
Atlanta, Georgia 30333.

March 1990

Agency for Toxic Substances and Disease Registry




Public Health Service
Agency for Health Care Policy and Research
ATSDR
Agency for Toxic Substances and Disease Registry
Alcohol, Drug Abuse and Mental Health Administration
Centers for Disease Control
Food and Drug Administration
Health Resources and Services Administration
Indian Health Service
National Institutes of Health

ATSDR

Agency for Toxic Substances and Disease Registry

Division of Health Education
1600 Clifton Road, N.E. (E33)
Atlanta, Georgia 30333
404-639-0730

Case Studies in Environmental Medicine. These self-instructional exercises in environmental medicine are designed to guide the primary care practitioner through the diagnosis, treatment, and surveillance of persons exposed to hazardous substances. Continued medical education credit is available for participants. Each issue presents a case study and discussion of a single hazardous substance. The first 15 documents, to be completed in June 1990, will cover arsenic, asbestos, benzene, cadmium, chromium, cyanide, dioxins, lead, radon, methylene chloride, vinyl chloride, trichloroethylene, tetrachloroethylene, PAHs, and PCBs. Contact Donna Orti, M.S.

Cosponsoring State Environmental Health Education Activities for Health Care Professionals. This program funds states to develop environmental health education programs for physicians and other health professionals. Awards have been granted to the following states: Arkansas, California, Colorado, Connecticut, Florida, Georgia, Illinois, Iowa, Kansas, Kentucky, Maine, Maryland, Massachusetts, Minnesota, Missouri, New Hampshire, New York, Rhode Island and Wisconsin. Contact Donna Orti, M.S.

Short Courses in Environmental Health. The National Association of County Health Officials (NACHO) receives funding to develop and implement short courses for educating physicians and other health professionals concerned with human exposure to hazardous substances in their local communities. Five courses will be offered during 1990. Contact Susanne Simon, M.S.

National Library of Medicine Database Systems Development, Training, and Dissemination. The objectives of this project are 1) to create a user-friendly online TOXNET System so that the inexperienced user can search this database with ease; 2) to revise and expand the Answer Workstation System, a CD-ROM database that allows quick access to chemical exposure information; 3) to train State and local health and environmental personnel to use TOXNET; and 4) to disseminate TOXNET information by exhibiting displays at professional meetings. Contact Jim Carpenter.

National Academy of Science - Institute of Medicine Committee on Enhancing the Practice of Occupational and Environmental Medicine. The final report on meeting the manpower needs for environmental and occupational health physicians and the resource needs of physicians for environmental and occupational medical information is being completed. Contact Max Lum, Ed.D., or Virginia Sublet, Ph.D.

Poison Control Center Initiatives. Through this project, which is presently in the planning stages, a national toxicology information network will be established to provide information and expert referrals to physicians and the public about environmental and occupational exposures. It will include designated poison control centers as test sites for the program and provide resource and training to personnel in these selected centers. Contact Max Lum, Ed.D., or Virginia Sublet, Ph.D.

Emergency Response Protocols. This project will create documents that will provide physicians relevant and accurate information regarding signs and symptoms, diagnosis and treatment, and monitoring of exposed persons to acute levels of hazardous substances. Contact Max Lum, Ed.D., or Virginia Sublet, Ph.D.

ATSDR Research Fellowships. This project currently supports a small number of clinical and postgraduate research fellows who conduct environmental health and health education research related to the ATSDR mission. Contact Peter Sherman or Lester Smith, Ph.D.

Clinical Network: The Association of Occupational and Environmental Clinics (AOEC). There are 30 clinics in 16 States and the District of Columbia and 142 individual members in the association. Support is being given to improve educational and communication activities related to surveillance, diagnosis, treatment and prevention of illness or injury related to exposure to hazardous substances. Contact Susanne Simon, M.S.

Dissemination of the Childhood Lead Report (The Nature and Extent of Lead Poisoning in Children in the United States: A Report to Congress, 1988). The Division of Health Education is responsible for disseminating the recommendations and findings of the Report to medical centers, clinics, and health providers dealing with populations at risk. Contact Jim Carpenter.

Projects in Health Risk Communication. ATSDR sponsors several research projects and training programs in health risk communication. Georgetown University Medical Center has conducted baseline surveys in selected communities on public and health professional knowledge and perceptions of chemical risks. Massachusetts Institute of Technology's investigation focuses on the ethical and legal issues associated with monitoring communities and workers exposed to hazardous substances. Association of State and Territorial Health Officials has developed a risk communication training program for State public health agency personnel. Contact Susanne Simon, M.S.

Immune Biomarkers Demonstration Project. ATSDR will support Centers for Disease Control and AOEC efforts to develop a method to assess the immune states of persons living near hazardous waste sites. A standardization and calibration method developed by the CDC laboratory will be placed in the flow cytometry laboratories that serve some of the AOEC clinics. The method will be used to develop analyses and collect data to explore the possible use of immunotoxicity as a biomarker for exposure to hazardous substances in the environment. Contact Donna Orti, M.S.

Educating Physicians in Occupational/Environmental Health (EPOCH). The Division of Health Education and NIOSH cosponsor a contract with Duke University Medical School to develop resources for education in occupational and environmental medicine. In coordination with programs at the University of Kentucky, University of Alabama at Birmingham, West Virginia University, and University of South Florida, Duke promotes the programs in primary care residency programs and the medical school curricula. The five medical schools will begin promoting occupational/environmental education programs at other medical schools in their respective states. Contact Donna Orti, M.S.

Evaluating Hazardous Waste Management Education. The Division of Health Education and the Health Resources and Services Administration cosponsor a contract with Wayne State University to survey and evaluate non-degree and graduate-level hazardous waste management programs in the United States. An electronic bulletin board has been created to access the database upon request. Contact Donna Orti, M.S.

Division of Health Education
Director
Max R. Lum, Ed.D.

ATSDR

The National Association of County Health Officials Cooperative Agreement for the Development of Environmental Health Short Courses

In 1989, the National Association of County Health Officials (NACHO) established a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). The purpose of this agreement is to develop the Environmental Health Project, a series of short courses on environmental health issues. The short courses will be targeted to local and county public health officials, private physicians, and other professionals whose responsibilities include protecting the health of the community. These courses will be designed towards improving an individual's or a community's ability to respond to actual or potential environmental health hazards.

Four areas of environmental health will be covered in the courses:

Environmental Toxicology and Epidemiology. How to recognize and evaluate possible environmental or occupational illness and how to identify potential environmental hazards in the community.

Health Risk Communication. Emphasis on improving the exchange of information and beginning a dialogue, understanding how individuals and communities perceive risk, developing an integrated risk communication program, and working effectively with the media.

Emergency Response. The role of local and county health officials in organizing local resources for response to a hazardous substance emergency as mandated by SARA Title III.

Special Topics. Several workshops on groundwater contamination, lead exposure, medical waste, and hazardous waste management are proposed.

These courses will be offered as part of NACHO's national conference agenda and at statewide or regional meetings. Continuing education credits will be offered to physicians and other health professionals.

For more information, please contact Susanne Simon, ATSDR, 1600 Clifton Road, NE (E-33), Atlanta, Georgia 30333, (404) 639-0730 or Jennifer Morrone, NACHO, (202) 783-5550.

ATSDR

State Cooperative Agreements to Develop Educational Programs for Health Care Providers

On September 15, 1989, the Division of Health Education (DHE) of the Agency for Toxic Substances and Disease Registry (ATSDR) awarded cooperative agreements to 11 States to support educational activities for physicians and other health professionals concerning human exposure to hazardous substances in the environment. State health departments receiving the awards will develop appropriate educational materials on medical surveillance, screening, and methods of diagnosis and treatment of injury or disease related to exposure to hazardous substances found in the nonworkplace environment. The awardees will use a variety of approaches including short courses, case studies, resource manuals, grand rounds presentations, and conferences. ATSDR/DHE will provide support and resources to the States. The intent of the program is to:

- Enhance the development, implementation, and evaluation of educational materials or methods to improve the skills and knowledge of health care providers concerning exposure to hazardous substances
- Promote the development of educational activities for health care professionals and demonstrate their effectiveness
- Develop materials or methods to be used by health care providers in communicating and counseling patients about health risks from exposure to hazardous substances
- Promote the development of methods or materials to improve the knowledge and skills of health care providers in taking an "environmental exposure history" as an integral part of their patient work-up
- Demonstrate the use of effective resources to provide health care professionals with information on hazardous substances

The States participating in these cooperative agreements are Arkansas, California, Colorado, Connecticut, Florida, Georgia, Illinois, Iowa, Kansas, Kentucky, Maine, Maryland, Massachusetts, Minnesota, Missouri, New Hampshire, New York, Rhode Island and Wisconsin. For additional information regarding this project, please contact Donna Orti, MS, ATSDR, Division of Health Education (E33), 1600 Clifton Road, NE, Atlanta, Georgia 30333. (404) 639-0730.

ATSDR

The Association of Occupational and Environmental Clinics Cooperative Agreement on Managing and Preventing Diseases Related to Hazardous Materials

The Association of Occupational and Environmental Clinics (AOEC) was formed in 1986 to facilitate communication and collaborative work among clinics dedicated to assessing possible occupational and environmentally related disease. There are 30 clinics in 16 states and the District of Columbia, and 142 individual members that have joined the association. The AOEC-affiliated clinics have a strong commitment to prevention, training, and research in the area of environmental hazards and disease.

Under this cooperative agreement the AOEC network is collaborating with the Agency for Toxic Substances and Disease Registry (ATSDR) on the goals:

- To build knowledge and skills concerning hazardous substance exposure.
- To train health practitioners to take an occupational and environmental history and to recognize environmental health effects through continuing medical education shortcourses and case study presentations.
- To improve the training of medical students, residents, and other health professional students in the same areas through case study presentations and curriculum development.
- To develop and test educational materials and printed resources for improving awareness of hazardous substances among health practitioners.
- To provide expertise on hazardous substance exposure assessment for clinicians; toxicology of environmental hazards; biological monitoring; taking the environmental/occupational history; the role and use of exposure and disease registries; and health risk communication.
- To develop and implement short courses, grand rounds, and conferences on specific environmental health issues related to Superfund sites and communities, and to address the needs of populations increased risk of exposure to hazardous substances.

For more information, please contact Susanne Simon, ATSDR, 1600 Clifton Road, NE (E-33), Atlanta, Georgia 30333, (404) 639-0730 or the Edmond Kelly, AOEC, (202) 682-1807.

ATSDR

Emergency Response Assistance

The Agency for Toxic Substances and Disease Registry (ATSDR) is the lead Federal public health agency for hazardous material incidents. The following services are provided by the Emergency Response and Consultation Branch, Division of Health Assessment and Consultation:

- ***Emergency Response Line (24-hour basis) Call (404) 639-0615.***

  Assistance on health issues surrounding the release or threat of release of hazardous materials. The following experts are available for consultation and advice:
  - Within 10 minutes: An Emergency Response Coordinator
  - Within 20 minutes: A Preliminary Assessment Team consisting of a Toxicologist, a Chemist, an Environmental Health Scientist, a Physician, and other health personnel as required
  - Within 8 hours (if the incident necessitates): An On-Site Response Team

- Assistance is provided to Federal, State, and local agencies, first responders, hospitals, private industry, and the general public.

- Health consultation and advice involving:
  - First Aid/Medical Treatment Protocols/Training and Implementation
  - Decontamination Procedures
  - Contingency Planning
  - Health Team Coordination
  - Evacuation/Re-Entry Consultation
  - Sampling Plans To Allow Assessment of the Health Threat
  - Worker Safety and Health
  - Other issues as appropriate

- ATSDR sponsors the following training and education programs:
  - The "Demonstration Workshop of an Integrated Emergency Response," a training program conducted in Louisville, Kentucky
  - Short-term training on integrated emergency response
  - Two manuals on the management of chemically contaminated patients in the prehospital and hospital settings (both available late 1990)

For more information, please contact:

Emergency Response and Consultation Branch
Division of Health Assessment and Consultation
The Agency for Toxic Substances and Disease Registry
1600 Clifton Road, NE (E32)
Atlanta, Georgia 30333
404-639-0615 **(Fax) 404-639-0655**

ATSDR Update: Goals for Implementing the Health Provisions of CERCLA

Barry L. Johnson

The Agency for Toxic Substances and Disease Registry (ATSDR) is one of seven agencies that constitute the Public Health Service. ATSDR was created by the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), but its health responsibilities were markedly increased under the 1986 amendments (Superfund Amendments and Reauthorization Act, or SARA) to CERCLA. Although I cannot here describe in detail the various programs we have under CERCLA, let me indicate their breadth. ATSDR conducts public health assessments of individual waste sites and facilities, sponsors or conducts health studies of persons exposed to hazardous substances, establishes health surveillance and exposure registries, prepares toxicological profiles on priority hazardous substances, provides educational materials to health care providers, and consults on the emergency release of hazardous substances.

As you can appreciate, our responsibilities are considerable. The bottom line, however, is preventing adverse human health effects that may result from exposure to hazardous substances released into the environment from waste sites, facilities, or from emergency releases such as spills.

A little additional background about ATSDR's health assessments is in order, since much of what ATSDR does under Superfund centers on them. Let me begin by providing a definition. ATSDR health assessments are evaluations of data and information on the release of hazardous substances into the environment in order to assess any current or future impact on public health, develop health advisories or other health recommendations, and identify studies or actions needed to evaluate and mitigate or prevent human health effects. The 1986 amendments to CERCLA require that ATSDR conduct health assessments of all sites placed on or proposed for the National Priorities List (NPL). In addition, individuals can petition ATSDR to conduct health assessments of sites of concern.

Health assessments have two principal uses. First, they advise EPA and states as to the degree of public health concern associated with individual sites. Second, ATSDR uses health assessments to identify sites and populations for which further study or public health action are needed. To date, we have conducted more than 1,000 health assessments. We are currently working on sites added to the NPL and on 70 petitions for health assessment. The petitions come from many sources: members of Congress, citizen groups, individual citizens, local officials, and attorneys. About 120 of the sites on the NPL are federal facilities, and the very complicated environmental characterization of these facilities make the health assessments difficult.

Here I will describe four goals that ATSDR has adopted to service the health provisions of Superfund. We formulated these goals as we undertook to perform new ATSDR mandates added under the amendments of 1986 to Superfund. Each goal is linked to specific charges in the health provisions of Superfund. As I highlight each goal, with its underlying purpose and ATSDR's efforts toward accomplishing it, I will emphasize the role that states play in implementing the health provisions of Superfund.

Increasing knowledge

The first goal is to increase scientific knowledge in environmental public health. Having stated this goal, I would expect the following questions to come to mind: "Isn't there a considerable amount of scientific knowledge already?" "Moreover, what do you mean by environmental public health?"

Let me answer the second question first. By environmental public health we mean the impact of environmental risk factors on the health and well-being of humans. When environmental risk factors are found to deleteriously affect public health, traditional methods of disease prevention come into play. This includes identification, evaluation, control, and dissemination of information bearing on the causes and methods of preventing the observed mortality or morbidity.

What about the other question— the amount of scientific knowledge about environmental risk factors? Well, a curious

ming happened on the way to the dump site. We, and others, have noted that without intensive investigation it's usually not possible to tell which dumps or spills have the potential for causing consequential threats to public health. Let me be more specific. ATSDR believes that some sites are sufficiently threatening to public health that some kind of health-based actions should be undertaken as soon as possible. We identify such sites through our health assessments of sites or facilities. At sites of special concern, we usually undertake exposure assessment studies. These may lead to health surveillance programs, epidemiological studies, exposure registries, or, if the conditions at or around the site are sufficiently severe, health advisories. Regardless of how we proceed, it is usually the case that scientific knowledge is inadequate for the extent of human exposure to the hazardous substances of concern. Our experience in conducting health assessments of individual sites led us to adopt the goal of increasing scientific knowledge in environmental public health. How are we going about this rather ambitious goal? Let me highlight some of our more important activities to date.

Exposure assessment

Which hazardous substances individuals or populations have been or are being exposed to is a matter of considerable importance. ATSDR has turned to the National Academy of Sciences for assistance in addressing scientific issues attending human exposure assessment. We have sponsored or co-sponsored with EPA and the National Institute of Environmental Health Sciences (NIEHS) a series of projects at the National Research Council (NRC) on biological markers and other methods for measuring human exposure to hazardous substances.

Two NRC reports are now available. One concerns biological markers in reproductive toxicology, and the other, biological markers in pulmonary toxicology. Three other NRC projects in various states of completion deal with biological markers in neurotoxicology, biological markers in immunotoxicology, and methods for assessing low-level lead exposure in young children.

ATSDR will use the recommendations from various NRC reports as guides in conducting exposure assessments of human populations that are currently or previously exposed to substances of health concern.

A second activity that ATSDR is conducting to advance scientific knowledge in environmental public health concerns human exposure assessments of target populations. Again, these populations are identified through our health assessments. ATSDR currently has about 30 exposure assessments or other kinds of health studies under way. About half of these are being conducted by state health departments through cooperative agreements with ATSDR. We believe the systematic collection of exposure data from studies of target populations will eventually constitute a rich resource for both researchers and public health officials.

Another program to increase scientific knowledge is ATSDR's substance-specific research effort. Superfund, as amended, requires ATSDR to assure the initiation of a program of research to fill significant data needs for priority hazardous substances. The list of priority substances now numbers 225. For each substance, ATSDR must write a toxicological profile that describes information gaps about the substance's toxicity and health effects. We currently have available 83 profiles, covering 99 individual substances. From the collection of data gaps will come the program of research. The criteria ATSDR, EPA, and the National Toxicology Program will use to identify significant data needs were published in the Sept. 11, 1989, *Federal Register*. ATSDR will publish early in 1990 in the *Federal Register* what we believe are the data needs for five priority substances.

This effort will initiate the substance-specific research program, to be followed in mid-1990 with a statement of data needs for an additional 45 substances. This research program promises to add a significant amount of new knowledge about the toxic properties, environmental fate and transport, bioaccumulation, and health effects of priority substances. ATSDR believes this knowledge will be useful in improving the quality of risk assessments, public health assessments, and risk management.

Developing databases

I turn now to a second agency goal: Promoting development and use of databases that can be used to assess associations between hazardous substances and human health outcomes. By databases I mean systematically collected data bearing on environmental conditions and health that can be used for Superfund objectives. The Toxic Releases Inventory is one example. Water contamination data constitute another, and ATSDR's database compiled from about 1,000 health assessments is yet another. Let me describe in some detail two other databases being promoted by ATSDR.

For the past four years, ATSDR has been supporting the development of state-based, health-outcome databases. Three states are collecting statewide data on chronic diseases that may be relevant in an environmental health context. The other eight states are collecting data on adverse reproductive health events (e.g., birth defects, low birth weights, and developmental disorders). Because not all states are collecting the same kinds of chronic disease or reproductive-outcome data, ATSDR will be able to determine which data work best for Superfund purposes. ATSDR's long-range plan is to link such health-outcome databases with relevant environmental databases to explore geographic and demographic associations between environment and health outcome.

To that end, the agency recently sponsored an important consensus-forming conference in Asheville, N.C., to look at sentinel adverse health events that may be useful in exploring environmental and health relationships. A pilot project in select southeastern states using sentinel health outcomes is a very real possibility.

Another important database being built in cooperation with the states is ATSDR's exposure registry. A registry is simply a collection of names and other relevant information for persons who have common characteristics. For an exposure registry, a characteristic common to the group is a presumptive or measured exposure to a priority hazardous substance. Exposure registries, if established under well-reasoned scientific criteria, can serve as valuable resources to epidemiological researchers interested in investigating the health consequences of long-term exposure to low concentrations of hazardous substances. ATSDR currently has exposure registries of persons exposed to trichloroethylene in groundwater, and dioxin in soil; a registry of persons exposed to benzene in groundwater is being considered.

Public awareness

Notwithstanding my earlier statement of the importance of advancing scientific knowledge about hazardous substances, there is much that we do already know. It is crucial that what we know about the toxic properties and health effects of acute and long-term exposure to hazardous substances be disseminated to both professionals and the public.

Therefore a third goal of ATSDR is to increase awareness and education about hazardous substances. This goal stems from the statutory mandate in CERCLA, as amended, that calls for ATSDR to develop educational materials, offer short-term training courses, and undertake other educational pursuits that will improve knowledge among primary care providers, health educators, medical educators, and emergency responders on the subject of hazardous substances. I would like to describe one of about 30 projects that respond to the goal of increasing awareness and education about hazardous substances.

ATSDR has recently entered into an agreement with 11 states to develop educational materials and provide technical assistance to health care providers within state boundaries. Most states will be providing training courses and other short-term offerings to physicians, other health care providers, and emergency responders on matters relating to hazardous substances. ATSDR believes that this kind of federal–state agreement will serve environmental health very well by enlarging the circle of persons who have some knowledge about hazardous substances.

Expanding services

The fourth goal is to increase environmental public health services at the federal, state, and local levels, and, where appropriate, in the private sector. ATSDR believes that because no one organization has all the resources, knowledge, or wisdom needed to deal with hazardous substances in the environment, all need to share what we know and can do. I will describe in brief one area of service that ATSDR is committed to increasing: our emergency response program.

ATSDR currently provides consultation and on-scene assistance in some instances during emergency situations that involve the release or potential release of hazardous substances. For example, our staff worked closely with many other federal, state, and private organizations in follow-ups to both Hurricane Hugo and the California earthquake.

Each year we provide about 1,800 consultations on matters relating to the release of hazardous substances. Still, we do not have a really good estimate of how many emergency releases of hazardous substances occur each year. We know that national reporting systems exist, but a recent study by the Centers for Disease Control concluded that all such systems have severe limitations for public health purposes.

For that reason, ATSDR has entered into a pilot project with five states to build a capacity for emergency health response and to collect standardized data on releases of hazardous substances that can be used for surveillance and epidemiological purposes. We anticipate using this project to guide us in further projects on event surveillance. From such an endeavor could come data that can be used to prevent or mitigate emergency releases of hazardous substances.

We believe that pursuit of these goals will eventually improve our ability to determine the extent of adverse health problems related to hazardous substances in the environment. This is our over-arching goal.

***Barry L. Johnson, Ph.D.**, is assistant administrator at the Agency for Toxic Substances and Disease Registry (1600 Clifton Rd., N.E., Mail Stop E28, Atlanta, Ga. 30333; 404-639-0700).*

ATSDR: YOUR RESOURCE IN

by Jennifer Morrone, M.S.Ed., Assistant Project

The Agency for Toxic Substances and Disease Registry (ATSDR) is a valuable resource for local health officials; it is an agency of the Public Health Service and is based in Atlanta, Georgia. ATSDR was created by Congress to protect the public from hazardous wastes and exposure to hazardous substances. The agency derives its authority from the health-related sections of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 best known as "Superfund," the 1984 amendments to the Resource Conservation and Recovery Act (RCRA) of 1976, and the amendments to CERCLA, better known as the Superfund Amendments and Reauthorization Act of 1986 (SARA).

The mission of the Agency is to prevent or mitigate adverse human health effects and diminished quality of life resulting from exposure to hazardous substances in the environment from waste sites and other facilities, or from emergency releases such as spills. ATSDR is working to increase scientific knowledge in environmental public health; to promote the development and use of databases used to assess the link between hazardous substances and human health effects; to increase awareness and education about hazardous substances; and to increase environmental public health services at the federal, state, and local levels.

To carry out these goals, the Agency has established programs to conduct public health assessments of hazardous waste sites and facilities, sponsors or conducts health studies of persons exposed to hazardous substances and offers consultations on the emergency release of hazardous substances. The Agency contributes to research and epidemiology by creating health surveillance and exposure registries, toxicological profiles on hazardous substances and by providing educational materials and activities to public and private health care providers and allied health professionals. Some of the Agency's key programs are described below. **The addresses and phone numbers are listed in the box on the next page.**

■ **Health Assessments and Health Studies** ATSDR is mandated to perform health assessments at hazardous waste sites placed on the National Priorities List (NPL) by the U.S. Environmental Protection Agency (EPA). The Agency is also mandated to perform health assessments when petitioned by EPA, State or local agencies, health professionals, or private citizens or organizations. Health assessments are conducted to assess any current or future effects on public health, develop health advisories or other recommendations, and identify studies or actions needed to evaluate and mitigate or prevent human health effects.

The health study is one step that may be recommended by the health assessment. This activity helps to determine the relationship between exposure to toxic substances and illness. The Division of Health Studies is responsible for epidemiologic and other health studies, human exposure assessments, a national registry of persons exposed to toxic substances, and a national registry of serious diseases and illnesses.

■ **Toxicological Profiles** Toxicological profiles describe the hazardous substances found at the NPL sites. A profile is to be written for each of the chemicals on the EPA priority pollutants list. Currently, 80 profiles are available. Each profile discusses environmental, chemical, medical, and public health aspects of the substance. This summary can be useful to environmental and health professionals as well as the public in understanding the health concerns associated with a particular substance. The longer range purpose of the toxicological profiles is to identify data gaps and research needs that the Agency will work to fill in the future.

■ **Case Studies in Environmental Medicine** The Division of Health Education is developing a series of documents called *Case Studies in Environmental Medicine* for State and municipal health department officials, physicians, residents, medical students, and other health professionals. These case studies are self-instructional educational materials designed to guide physicians through the diagnosis, treatment, and surveillance of persons exposed to hazardous substances. Each case study is written for a specific chemical on the NPL list. The first 15 documents, available in April 1990, will include monographs on the toxicity of the following substances: arsenic, asbestos, benzene, cadmium, chromium, cyanide, dioxins, lead, methylene chloride, polyaromatic hydrocarbons, polychlorinated biphenyls, radon, tetrachloroethylene, trichloroethylene, and vinyl chloride. Continuing medical education credits are available.

■ **Cooperative Agreements** Several cooperative agreements enhance ATSDR's ability to promote environmental health education. One such cooperative agreement involves NACHO. Under the agreement, NACHO is developing a series of short courses in environmental health for local health officials, physicians, and other public health professionals to be offered at national and regional meetings in 1990. ATSDR also has cooperative agreements with 11 State health departments to develop educational materials and activities in environmental medicine for health care professionals. The States participating are Arkansas, California, Colo-

ATSDR continued on page 3

rado, Florida, Illinois, Iowa, Maryland, Massachusetts, Minnesota, New Hampshire, and Wisconsin.

Another cooperative agreement, with the Association of Occupational and Environmental Clinics (AOEC), focuses on educating primary care professionals. The association plays a key role in medical care, surveillance, and health and medical education, influencing the development of environmental health programs in medical school curricula. AOEC projects include developing a grand rounds presentation on the health effects of hazardous waste sites and creating continuing medical education programs.

- **Databases** ATSDR assists in establishing and maintaining the toxicological databases of the National Library of Medicine (NLM). TOXNET is the primary network developed by NLM's Toxicology Information Program. A primary resource for toxicological information, TOXNET contains a variety of files, including the Hazardous Substances Data Bank (HSDB) and the Registry of Toxic Effects of Chemical Substances (RTECS). ATSDR and NLM are currently developing user-friendly menus for searching the HSDB file, which contains peer-reviewed, factual information on more than 4100 chemicals.

- **Emergency Response** ATSDR provides health-related support in public health emergencies involving hazardous substances. A 24-hour emergency response number (404/639-0615) offers expert consultation in emergency response coordination, toxicology, chemistry, medicine, and environmental health, and if necessary, response to the scene. (Please note that the emergency response number has recently been changed.) Topics for consultation and advice include health team coordination, contingency planning, decontamination procedures, first aid and medical treatment protocols, public affairs, sampling plans for health assessment, worker safety and health, evacuation and re-entry consultation, exposure pathway assessment, and health information acquisition and distribution.

SAVE THESE IMPORTANT REFERENCES

GENERAL - ATSDR, E28, 1600 Clifton Road, N.E., Atlanta, GA 30333; telephone (404) 639-0700.

HEALTH ASSESSMENTS - ATSDR, E32, Division of Health Assessment and Consultation, (404) 639-0610.

HEALTH STUDIES/EXPOSURE AND DISEASE REGISTRIES - ATSDR, E31, Division of Health Studies. (404) 639-0561.

TOXICOLOGICAL PROFILES - ATSDR, E28, Division of Toxicology. Final versions of the profiles are available through the National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161, 1-800-336-4700 or (703) 487-4650.

CASE STUDIES IN ENVIRONMENTAL MEDICINE - Copies may be obtained by writing Donna Orti, ATSDR, E33, Division of Health Education, 1600 Clifton Road, N.E., Atlanta, GA 30333.

ASSOCIATION OF OCCUPATIONAL AND ENVIRONMENTAL CLINICS - A list of specific clinics in the United States and information on the association's educational activities may be obtained from Stephen Mooser, Executive Director, AOEC, 254 College Street, Suite 505, New Haven, CT 06510.

NATIONAL LIBRARY OF MEDICINE - 8600 Rockville Pike, Bethesda, MD 20894, 1-800-638-8480 or (301) 496-6193. Databases are available online through a personal computer and modem connection, or in a medical library.

EMERGENCY RESPONSE - ATSDR, E32, Division of Health Assessment and Consultation, (404) 639-0615.

Attention: Request for Successes

NACHO would like to provide the opportunity for local health officials to share their successes in effectively integrating their local health department into the **emergency response** system by possibly incorporating appropriate examples into an environmental health short-course. NACHO is planning a short-cours concerning the role of local health officials in emergency response to hazardous substances. The course will be one of a series of environmental health short courses on the ATSDR-NACHO Environmental Health Project agenda. **Please send information regarding successful models to the attention of Jennifer Morrone at NACHO.**

ATSDR REGIONAL OFFI

September 25, 19

REGION I

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Emergency Service Division
EPA Region I
60 Westview
Lexington, MA 02173

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Bonnie Clark
Secretary

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REGION II

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Secretary, NY Office

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REGION III

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347-5205-Alt

Robert E. Safay

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THE ILLINOIS DEPARTMENT OF PUBLIC HEALTH

PRESENTS

HAZARDOUS CHEMICALS: CLINICAL TIPS

AT

Belleville Memorial Hospital
4500 Memorial Drive
Belleville, IL

Auditorium Areas A & B

Tuesday November 19, 1991

Two Workshops:
1:00 pm - 2:30 pm
and
3:00 pm - 4:30 pm

FOR

Nurses and Other Health Professionals

THIS WORKSHOP IS MADE POSSIBLE THROUGH A CO-OPERATIVE AGREEMENT WITH THE AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

Co-Sponsors: ALAI's ILLINOIS THORACIC SOCIETY
BELLEVILLE MEMORIAL HOSPITAL

HAZARDOUS CHEMICALS: CLINICAL TIPS

OBJECTIVES

This environmental/clinical module is designed for Illinois health professionals practicing in areas of the state with occupational and/or environmental exposure to hazardous chemicals. It will specifically address the importance of taking environmental and occupational histories, clinical concerns when treating acute verses chronic exposure to chemicals, and health professional protection while treating victims of hazardous chemical exposure.

At the end of this workshop participants will be able to:

1. Identify ways to incorporate environmental and occupational histories into patient screening programs.

2. List techniques for patient assessment and treatment in cases of suspected occupational or environmental exposure to hazardous chemicals.

3. List the state and federal remedial action programs responding to the regional environmental problems.

4. Identify personal protection equipment necessary while treating victims of hazardous chemical exposure.

SPEAKER CVs

Sharron E. LaFollette, Ph.D.
Environmental Toxicologist
Illinois Department of Public Health
Division of Environmental Health
525 West Jefferson Street
Springfield, IL 62761
(217) 782-5830

Dr. LaFollette received a B.A. in biology from Augustana College in Rock Island, Illinois; an M.A. in biology from Sangamon State University in Springfield, Illinois; and a Ph.D. in toxicology/pharmacology from Oregon State University in Corvallis, Oregon. As a toxicologist she has worked for the Illinois Environmental Protection Agency, the Abandoned Mined Lands Reclamation Council, and is currently working in the Environmental Toxicology Program at the Illinois Department of Public Health (IDPH).

Dr. LaFollette has research experienced in xenobiotic metabolism and developmental toxicology. She has over five years experience in assessing human and environmental risk from chemical exposure. Currently her duties at IDPH include preparing health and risk assessments, interpreting the results of environmental or biological samples, reviewing chemical- and concept-specific literature, staff training and coordinating the development of educational materials targeted at both health care professionals and citizens to increase awareness of the potential for health-related problems from exposure to hazardous chemicals.

OVERVIEW

HAZARDOUS CHEMICALS: CLINICAL TIPS

EVALUATION

Speaker: Sharron LaFollette, Ph.D.

Your evaluation is appreciated and will help us improve future workshops and seminars and better address the needs of area health care professionals.

Please rate the extent to which you agree with the following statements.

1 - Strongly Disagree
2 - Disagree
3 - Undecided
4 - Agree
5 - Strongly Agree

	SD	D	U	A	SA
1. The seminar was well organized.	1	2	3	4	5
2. The speaker was well prepared and knowledgeable.	1	2	3	4	5
3. The speaker allowed adequate time for questions and discussion.	1	2	3	4	5
4. This information will be helpful in my practice.	1	2	3	4	5
5. I would attend another workshop or seminar addressing environmental public health issues in this region.	1	2	3	4	5
6. This seminar was informative and improved my understanding of low-level vs high-level hazmat exposure.	1	2	3	4	5
7. I would like more information on environmental and occupational hazards (please give name and address below).	1	2	3	4	5

Additional comments:

_____

_____

_____

LEAD HOTSPOTS

Three lead "hotspots" have been identified in Madison and St. Clair Counties. Each "hotspot" is briefly discussed below: NL/Taracorp, Granite City; Collinwood Subdivision, Collinsville; and several neighborhoods in East St. Louis.

NL Industries/Taracorp

Taracorp is a National Priority List (Superfund) Site located at 16th and Cleveland in Granite City. It operated as a secondary lead smelter from the late 1800s to 1982, and created an estimated 90,000 cubic feet of lead waste which remains in several piles on-site. Operations have also contaminated soil in the neighborhoods surrounding the site with lead. During the process of preparing a health assessment, the Illinois Department of Public Health (IDPH), through a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR), determined that the site is a potential health hazard. As a result, IDPH is currently conducting a health study to determine the relationship between soil lead concentrations and human blood lead concentrations, focusing on children between the ages of six months and six years. Communities effected by the site include parts of Granite City, Madison, and Venice. The United States Environmental Protection Agency (USEPA) is scheduled to remove contaminated surface soil from a 55 block area surrounding the site.

Collinwood Subdivision

The Collinwood Subdivision is developed on property that was once the site of the St. Louis Smelting and Refining Company. This lead smelter operated between 1911 and 1933. Aerial photographs indicate that prior to the development of the subdivision, several slag piles surrounding the smelter were leveled and the slag graded flat. This slag is spread over approximately a six block area and chunks of slag can be seen in the surface soil. Children in the Collinwood Subdivision have been screened for erythrocyte protoporphyrin (EP) by the IDPH and high exposures were not identified. Soil samples have been taken by the Illinois Environmental Protection Agency and IDPH to determine whether the lead particles in the soil are small enough to be bioavailable. Analyses of these samples have not been completed.

East St. Louis

Of the over 6,000 children screened by the East Side Health Clinic each year, between 100 and 200 East St. Louis children

have been found to have elevated blood lead levels by the old Center for Disease Control guidelines of 25 mg/dl. This number is expected to at least double when, as proposed, the guidelines are lowered to 10 mg/dl. The areas which have groups of children with elevated lead levels include the Lansdowne and Winstanley neighborhoods and a section of Washington Park. Many of these children were exposed to lead paint in the home, however, some of the sources of exposure do not appear to come from the indoor environment.

Ambient air lead measurements were taken for one year (August 1988 to August 1989) in two areas of East St. Louis. The two locations were sampled every six days and the air lead levels did not exceed the National Ambient Air Quality Standards for lead. Soil samples have been taken by the IDPH in the yards of children with elevated blood lead levels. The results of this sampling indicated that soil lead levels were, on average, twice as high within one foot of the house as they were in the middle of the yard. Although leaded paint may be one source, the exact source(s) of yard soil lead may vary through the area. The source of exposure, in at least one case, was determined to be soil contaminated with fill material brought from another area.

sllead

State and Regional Hazardous Waste Site Summary Sheet

Abandoned sites containing hazardous waste which pollute or threaten to pollute the environment are found throughout Illinois. In Illinois, the hazardous waste cleanup program comprises the following:

1. National Priority List (NPL), also called Superfund;
2. State Remedial Action Priority List (SRAPL);
3. Immediate and "Pre-noticed" Removals; and
4. Leaking Underground Storage Tanks (LUST).

National Priority List (NPL)

In 1980, Congress passed a law creating a tax to generate a fund (hence the name Superfund) through which the Federal government could respond directly to the release or threatened release of hazardous substances that may endanger public health or the environment.

In the Superfund program, hazardous waste sites are inspected and scored to determine whether they are eligible for the fund. If a site scores 28.5 or higher, it may be placed on the National Priority List. Scoring is based on the potential threat posed by a site to human health and the environment. Although the score is not an exact indicator of the health and/or environmental threat, those sites posing the greatest danger are usually found on the NPL.

In Illinois, there are currently 38 NPL sites compared with approximately 1230 nationwide. In Madison and St.Claire Counties, there are 2 NPL sites.

State Remedial Action Priority List (SRAPL)

Sites scoring less than 28.5 also pose a threat to human health and the environment. In 1984, Illinois initiated a program to remediate those sites that do not qualify for Superfund.

The number of sites on SRAPL has grown from 14 sites in 1985 to 34 in 1991. Of this group, there are 4 sites in Madison and St.Claire Counties. The total number is expected to reach at least 60 sites as Illinois completes its assessment of potential cleanup sites.

Immediate and "Pre-noticed" Removals

Immediate Removals are those that fail to make either the NPL or SRAPL. Although such sites may appear insignificant, cleanup is necessary. At pre-noticed sites (formerly known as voluntary cleanup sites) cleanup is conducted by the property owner.

As Illinois progressed with cleanups at sites on the NPL and SRAPL, the number of Immediate Removals shot up from 6 in 1985 to over 50 in 1991. The number of Pre-noticed Removals requiring Illinois Environmental Protection Agency (IEPA) oversight increased from 9 to more than 130.

There are approximately 24 Immediate Removal and Pre-noticed Removal sites in Madison and St.Claire Counties.

Leaking Underground Storage Tanks (LUST)

Although few of the estimated 80,000 tanks in Illinois contain hazardous wastes, those that do contribute to the problems associated with sites on the NPL, SRAPL and Immediate and Pre-noticed Removals.

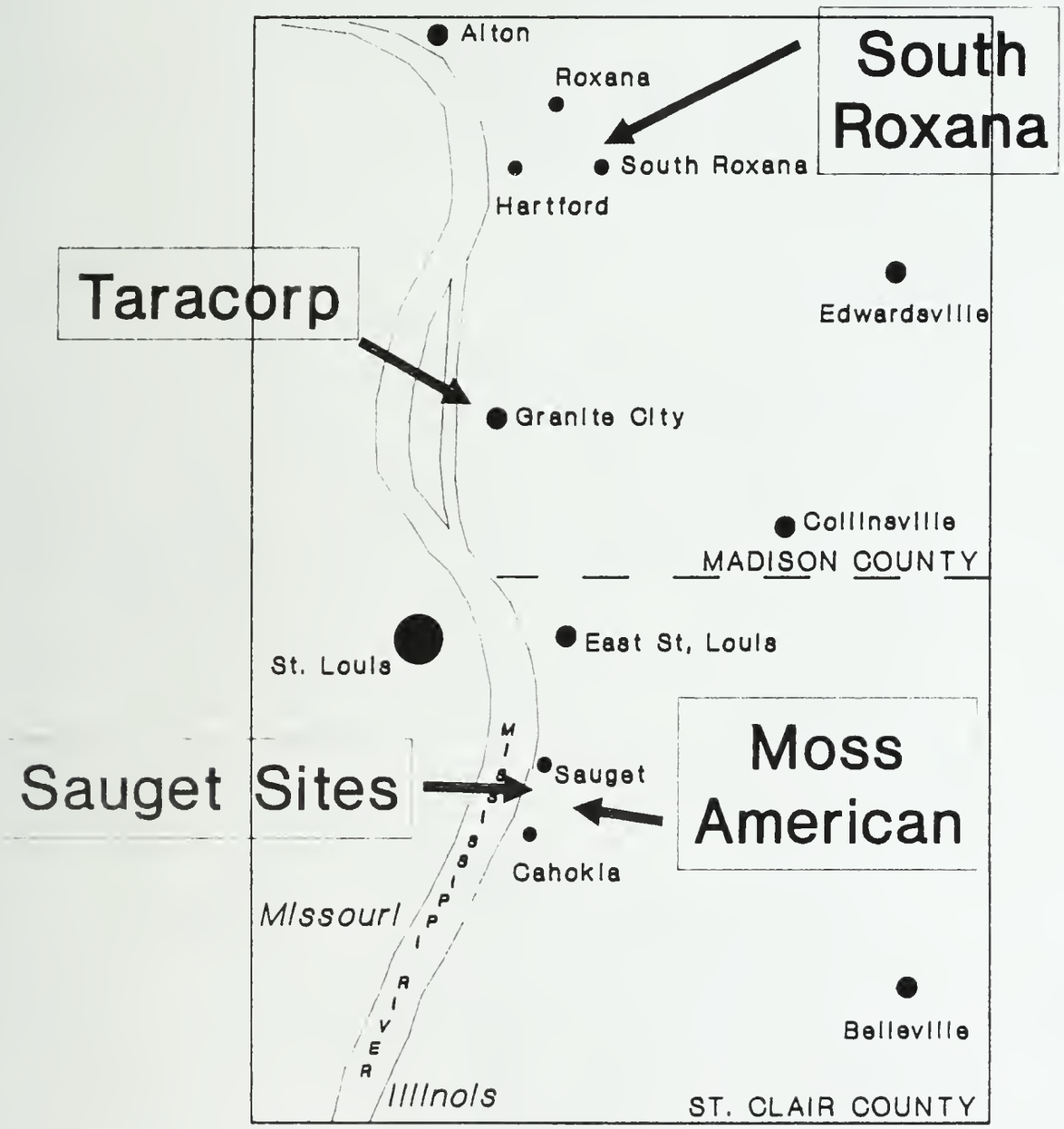
To date, 4800 LUST incidents have been reported to the IEPA.

The biggest risks associated with leaking tanks are:

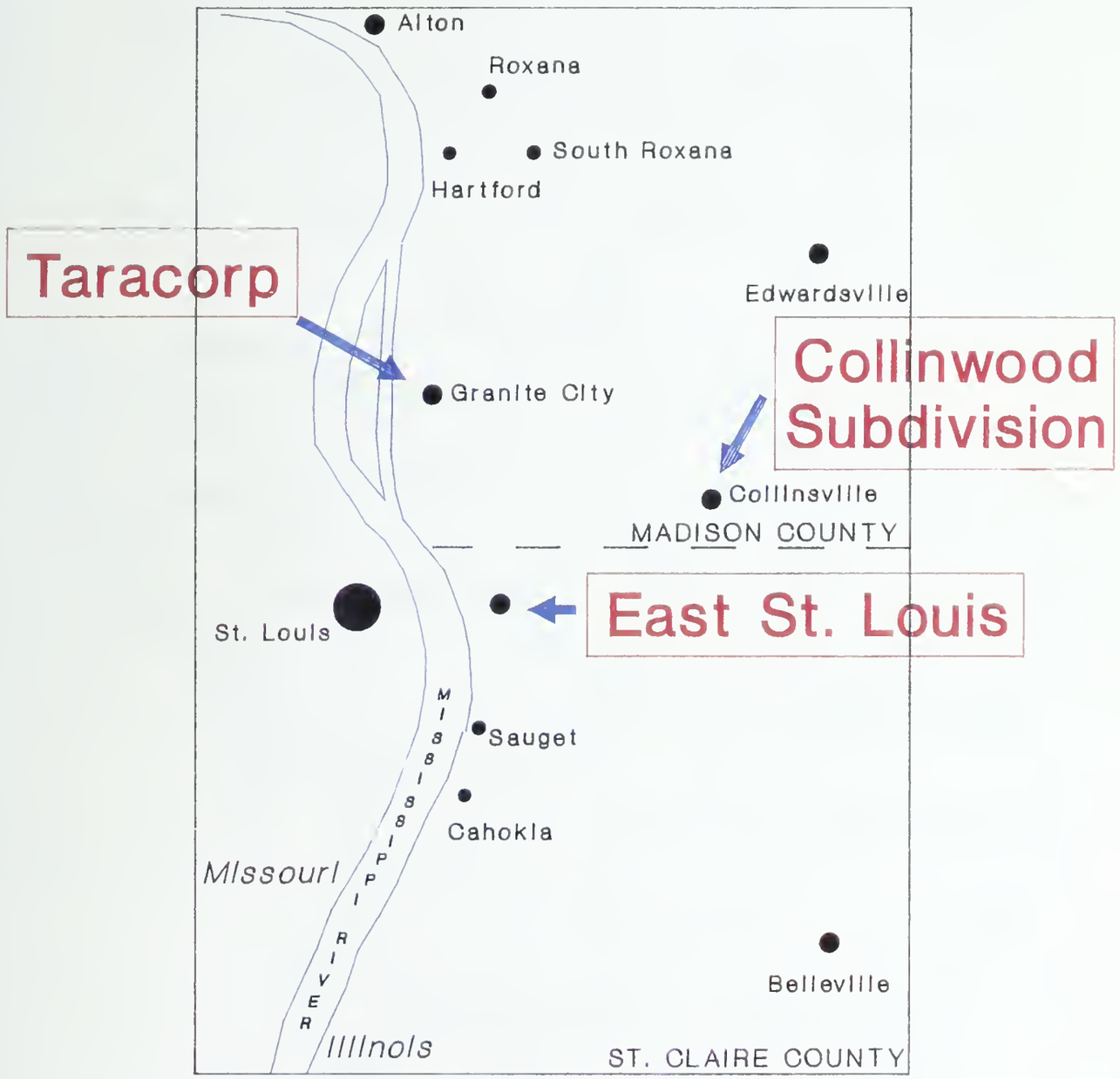
1. fire and explosion from accumulated fumes and vapors, and
2. drinking water contamination.

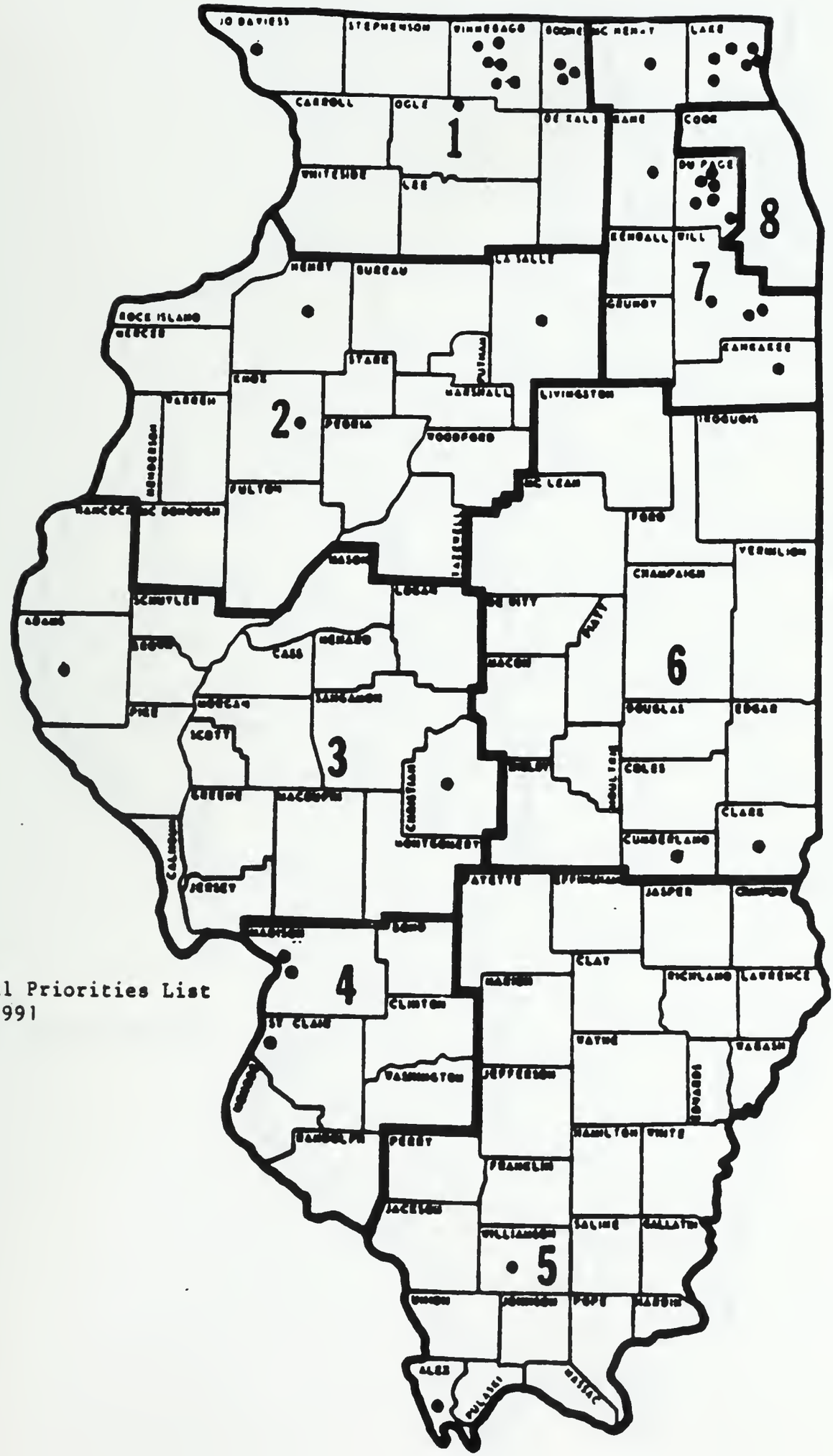
There are currently 265 LUST sites in Madison and St.Claire Counties.

HAZARDOUS WASTE SITES
MADISON & ST. CLAIR COUNTIES

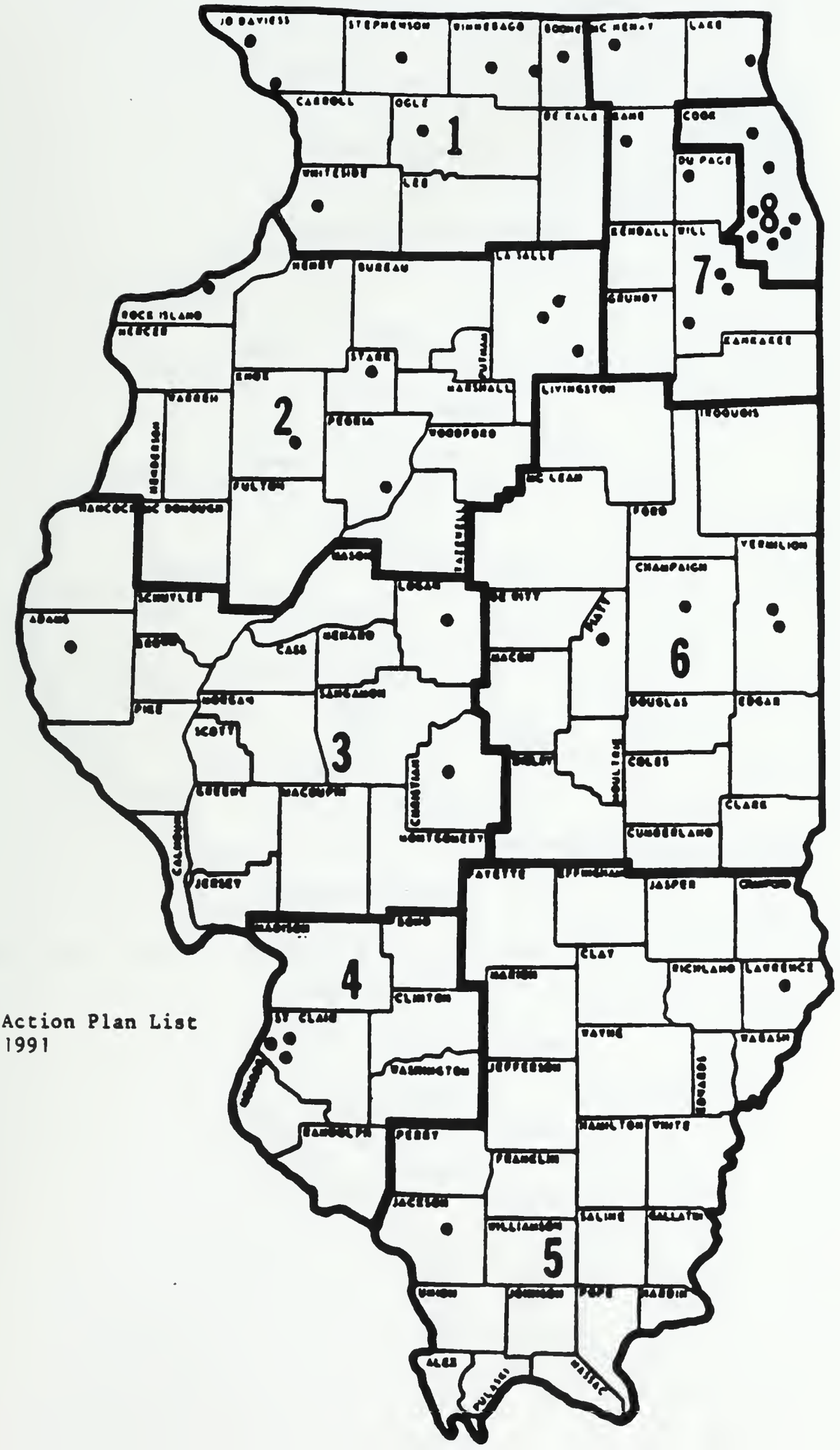


LEAD HOT SPOTS
MADISON & ST. CLAIRE COUNTIES

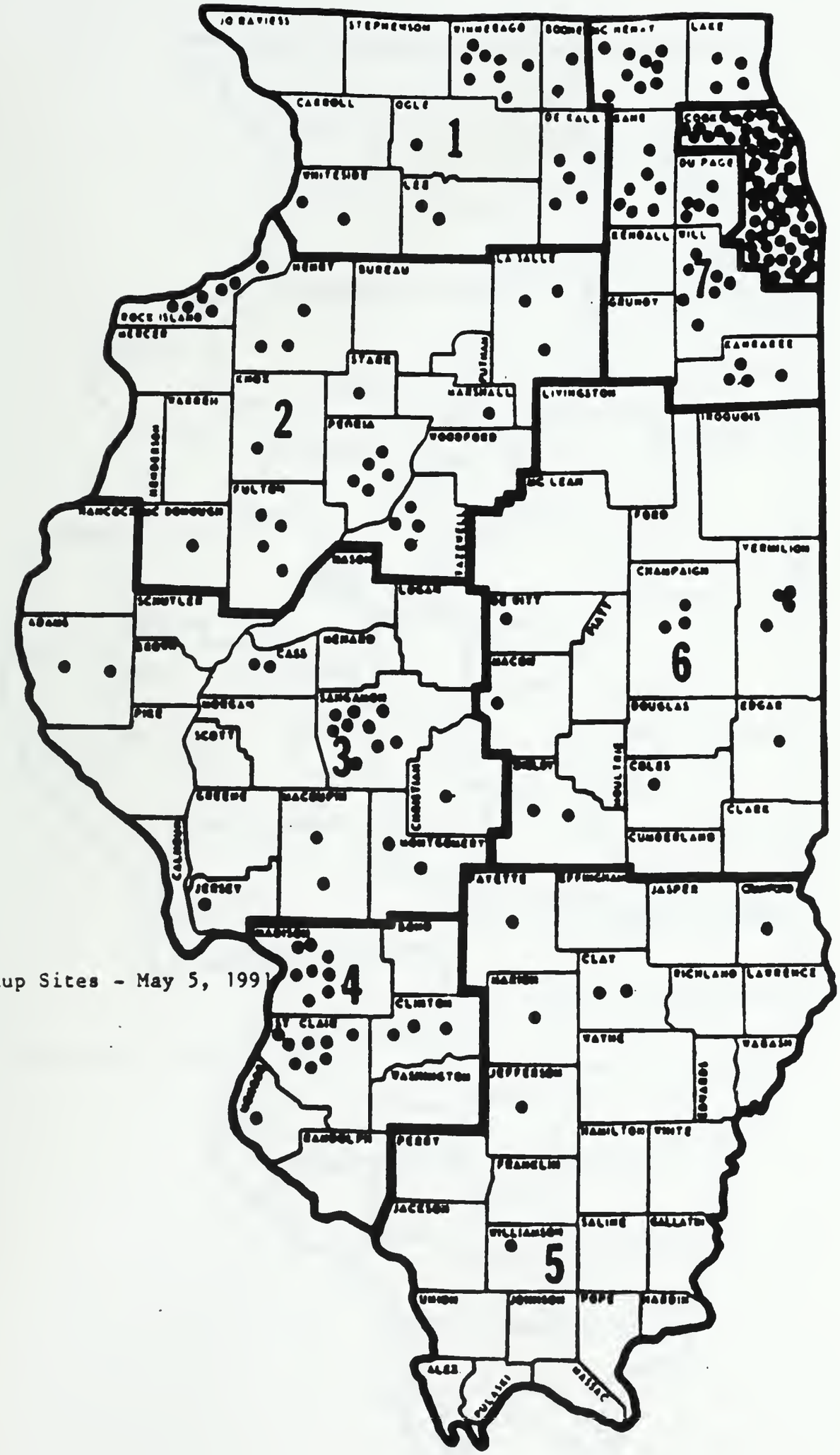




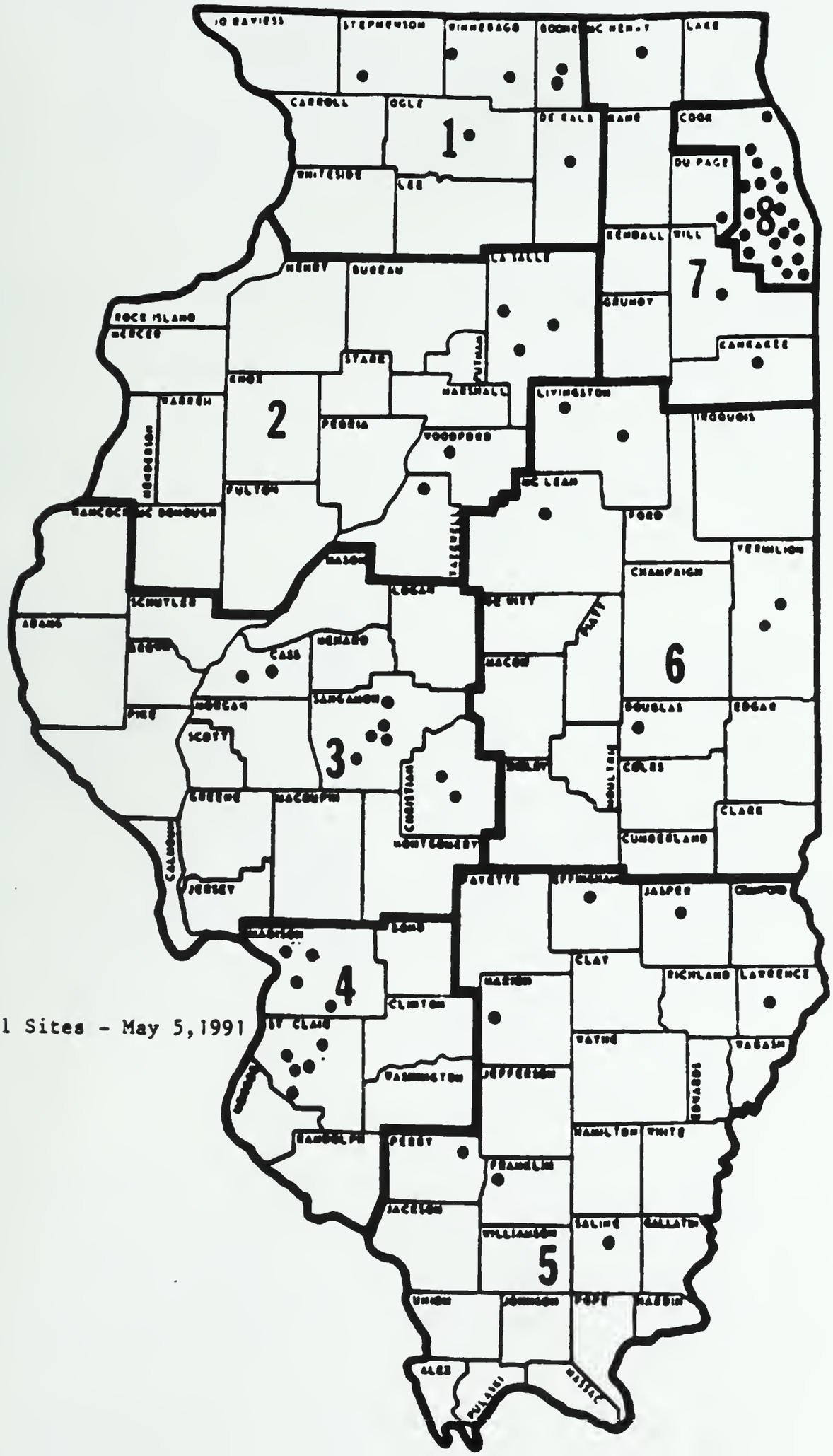
Illinois National Priorities List
Sites - May 5, 1991



State Remedial Action Plan List
Sites - May 5, 1991



Voluntary Cleanup Sites - May 5, 199



Immediate Removal Sites - May 5, 1991

ILLINOIS DEPARTMENT OF PUBLIC HEALTH
A Healthier Today For A Better Tomorrow

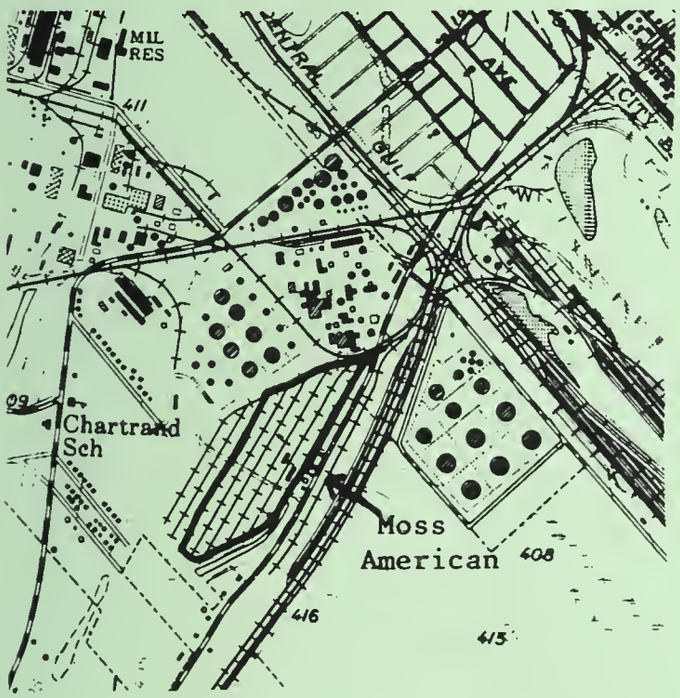
September 1991

SRAPL Site: MOSS-AMERICAN WOOD TREATING FACILITY

Moss-American Wood Treating Facility (Moss-American) is one of 34 State Remedial Action Priority List (SRAPL) sites in Illinois. The Illinois Department of Public Health is evaluating each SRAPL site's potential to harm public health. This pamphlet summarizes the findings, concerns, and recommendations for Moss-American.

A site qualifies for the SRAPL program when the Illinois Environmental Protection Agency determines that there is a release or threatened release of hazardous substances which may endanger public health, welfare, or the environment.

***** Do not trespass on SRAPL sites *****



Sauget, Illinois
* Population: 200
* Population within a one mile radius: ≈4,730
* Closest residence within 50 feet of site boundary
* Sauget Sites approximately 2000 feet west of site

SITE DESCRIPTION AND HISTORY

Moss-American is located in Sauget, Illinois and covers an area of 40.13 acres. The site is a former wood treatment facility that was in operation from approximately 1929 to 1969. During this period, creosote, coal tar solutions, and pentachlorophenol (PCP) were used and disposed of on-site. The United States Environmental Protection Agency estimates that currently 11,519 cubic yards of waste, including contaminated soils and piled waste materials, remain on-site.

T.J. Moss Tie Company constructed the Sauget Wood Treatment Plant in the mid-1920s on 59.6 acres. They produced pressure-treated railroad ties and line poles from 1927 to 1963. In 1963, Kerr-McGee bought the wood

treatment plant, and it became a subsidiary called Moss-American. This name was later changed to Forest Products Division of Kerr-McGee Chemical Corporation which included several other wood treating facilities. The Forest Products Division continued the production of pressure-treated wood until 1969. In 1973, the site was sold to its current owner, Lefton Iron and Metal Company (LIMC). LIMC, based in East St. Louis, deals in scrap metal. LIMC never used the facility for wood treatment, but did remove some of the plant's wood treating equipment.

The facility can be divided into six areas: the impoundment area, which also includes areas adjacent to the impoundment that contain dredge pits; the process area where the wood was actually treated; the drip track; the slough area, which is northeast of the drip track; the treated tie storage area; and the untreated tie storage area. Treated wood products manufactured at the plant included railroad ties, fence posts, utility posts, construction pilings, and lumber.

Railroad ties, fence posts, and lumber were air-seasoned while utility poles and construction pilings were treated by open-steaming. Contaminated water from open-steaming operations was discharged to the north surface impoundment. Product was recovered from this impoundment on an annual or semi-annual basis. In the early 1960s, T.J. Moss dredged the sludge from the north impoundment and placed it on the earthen bank of the impoundment.

The north and south surface impoundments make up the plant's waste water treatment system. Both are 60 feet wide, with an average depth of 3 feet. The north impoundment was 500 feet long while the south impoundment was 650 feet long. Process waste waters and some surface water runoff were discharged to both impoundment areas. The treatment used was gravity separation with excess water either evaporating or seeping into the soil. Normally, water flowed from the north to the south impoundment. Occasionally, water from the south impoundment was pumped to the western portion of the treated tie storage area to prevent overflowing of the impoundment areas. Runoff that did not go to the ponds drained to a seepage sump in the middle of the site. These two systems, the impoundments and the sump, reportedly prevented surface water runoff from impacting surface waters off-site.

The only equipment remaining on-site is a creosote cylinder. Concrete floorings from the buildings also remain on-site. The site is enclosed by an 8-foot chain-link fence, topped with three strands of barbed wire restricting access.

PUBLIC HEALTH IMPLICATIONS

SOIL

Soil on-site is contaminated with several semi-volatile organic compounds consistent with wood treatment activities (see table). Contamination has likely occurred as a result of spillage, loading and unloading activities, on-site dumping, and storage of materials on-site.

Since the site is surrounded by a chain-link fence, exposure to contaminated soils through direct contact is unlikely. Contaminated soils may, however, continue to release contaminants to the groundwater.

Contaminated dust generated from surface soils on-site pose a potential exposure route to nearby residents.

GROUNDWATER
Groundwater on- and off-site is contaminated with volatile organic compounds (VOCs) and semi-volatile organic compounds. The on-site contaminated soils provide a pathway for the contaminants to migrate into the groundwater. Groundwater flow in the area is to the west-southwest.

It is estimated that more than 2,700 people in the area use private wells. Domestic use of contaminated groundwater presents the most significant human exposure pathway. The following are various household activities that would contribute to contaminant exposure:

1) Drinking contaminated water;

2) Bathing or showering: exposed skin may absorb contaminants, and contaminants may vaporize from the water into the air;

3) Cooking: eating food cooked in contaminated water, and contaminants may vaporize from the water into the air while cooking; and

4) Other household activities: washing clothes and dishes, using humidifiers, and watering gardens with contaminated groundwater.

SURFACE WATER
Water samples from the on-site ponds indicate surface water contamination with several polynuclear aromatic hydrocarbons (see table). Since access to the site is restricted, surface water contamination poses an insignificant threat to public health. Contaminants may, however, leach from the ponds into the groundwater. No off-site surface water contamination has been detected at this time.

AIR
To date, no air monitoring has been done at this site. It is likely, however, that contaminants are volatilizing from various sources on-site, including contaminated soils and waste piles. Fugitive dust from contaminated soils may also contribute to air contamination within the site boundaries and nearby areas.

RECOMMENDATIONS

1) Contaminated soils on-site should be removed and disposed of at a licensed hazardous waste landfill.

2) Physical and chemical hazardous wastes on-site should be removed and disposed of off-site.

3) Further environmental sampling should be done to determine the extent of contamination.

CHEMICALS OF CONCERN

MOSS-AMERICAN WOOD TREATMENT FACILITY

GROUNDWATER: chemicals detected at levels of concern. This is not a list of all contaminants in the groundwater. (* chemical has USEPA standard for public water supply, and exceeds the standard.)

VOLATILE ORGANIC COMPOUNDS

benzene*	ethylbenzene	toluene
xylenes		

SEMI-VOLATILE COMPOUNDS

benzo(a)pyrene*	chrysene*	dibenzofuran
fluoranthene	naphthalene	pentachlorophenol*
phenanthrene	pyrene	dioxins

SOIL: Chemicals found in on-site soil samples above levels of concern. This is not a list of all chemicals found in the soil.

SEMI-VOLATILE ORGANIC COMPOUNDS

benzo(a)pyrene	chrysene	dibenzofuran
fluoranthene	naphthalene	phenanthrene
pyrene	dioxins	

SURFACE WATER: Chemicals found in on-site samples above levels of concern. This is not a list of all chemicals found in surface water.

SEMI-VOLATILE ORGANIC COMPOUNDS

acenaphthene	anthracene	benzo(a)anthracene
benzo(a)pyrene	benzo(b)fluoranthene	chrysene
dibenzofuran	dioxins	fluoranthene
naphthalene	phenanthrene	pyrene

For more site-related public health information, contact:

Illinois Department of Public Health
Region 4
#22 Kettle River Drive
Edwardsville, Illinois 62025
(618) 656-6680

ILLINOIS DEPARTMENT OF PUBLIC HEALTH
A Healthier Today For A Better Tomorrow

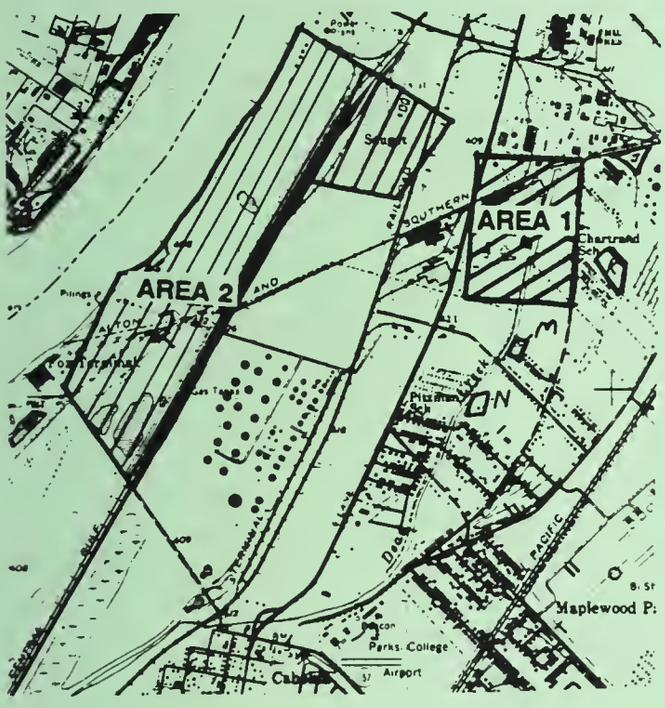
September 1991

Proposed Superfund Site: SAUGET SITES - AREA 1

The Sauget Sites are composed of 18 hazardous waste sites in and around Sauget, Illinois and are being evaluated for inclusion on the National Priority List (Superfund). These sites have been grouped by the Illinois Department of Public Health (IDPH) into Area 1, Area 2, and the Peripheral sites. IDPH, in conjunction with the Agency for Toxic Substances and Disease Registry, is evaluating each proposed Superfund site's potential to harm public health. This pamphlet is a summary of the findings, concerns, and recommendations for Area 1 Sauget Sites.

A site qualifies for the Superfund program when the U.S. Environmental Protection Agency (USEPA) determines that there is a release or threatened release of hazardous substances which may endanger public health, welfare, or the environment.

***** Do not trespass on Superfund sites *****



Sauget, Illinois

* Population within a three-mile radius: 75,248
* Number of sites in Area 1: 6
* Closest residents: Directly adjacent to some sites
* Residential and industrial areas adjacent to the sites

AREA 1 DESCRIPTION AND HISTORY

Area 1 consists of sites G, H, I, L, and Dead Creek Sectors A and B. These sites include subsurface disposal areas (sites G, H, and I), a surface impoundment area (site L), and Dead Creek Sectors A (CS-A) and B (CS-B).

Site G occupies approximately 4.5 acres south of Queeny Avenue and West of Dead Creek Sector B in Sauget. The surface of Site G is littered with demolition debris and metal waste, deteriorating drums, and oily tar-like wastes. Aerial photographs of Site G indicate an excavation in 1950, which was filled in by 1980. The owners and operators during the waste disposal period are unknown. Access to this site is restricted by a fence.

Site H is a subsurface disposal area that covers approximately 5 acres in Sauget. The site is located just south and west of the intersection of Queeny Avenue and Falling Springs Road. The site appears level and vegetated. Aerial photographs indicate Site H was used for waste disposal from approximately 1940 until 1960. The site is owned by James Tolbird of Roger's Cartage Company. Access to the site is unrestricted.

Site I, a former borrow pit that covers approximately 55 acres, is currently owned by Cerro Copper Products. It is located on the eastern one-third of Cerro Copper Products property, just north and east of the intersection of Queeny Avenue and Falling Springs Road in Sauget. The pit was filled in sometime between 1955 and 1962. The Monsanto Chemical Company indicated that drums of organic and inorganic compounds and solvents were disposed of on-site. Monsanto Chemical Company records indicate that at one time sites H and I were contiguous. Access to the site is restricted by a fence.

Site L is a former surface impoundment that was used to dispose of truck rinse water from a hazardous waste hauling business. The site is located approximately 500 feet south of Queeny Avenue and 125 feet east of Dead Creek in Cahokia and is approximately 70 feet by 150 feet. The site is level and covered with black cinders. The pit was dug by Waggoner Trucking Company after the Illinois Environmental Protection Agency (IEPA) ordered the owner, Mr. Waggoner, to stop discharging waste to Dead Creek in 1971. In 1974, Waggoner sold the business to Ruan Trucking. The storage pit was reportedly used by Ruan Trucking for the same purpose: waste water storage. The IEPA estimates that between 1971 and 1978, 164,000 gallons of waste waters were disposed of in the storage pit. Access to the site is unrestricted.

CS-A and CS-B are located in Sauget and Cahokia, respectively. CS-A, located west of Site I on Cerro Copper Products property in Sauget, currently forms two holding ponds that receive and hold surface and roof runoff from Cerro Copper. Although the water in the ponds is discolored and oily, no wastes are currently discharged into CS-A. Presumably, contamination is from past discharges. The CS-A no longer discharges to the lower sections of Dead Creek due to the blocking of a culvert under Queeny Avenue. Site access is restricted by a fence.

CS-B is just south of CS-A between Queeny Avenue and Judith Lane. Part of CS-B is in Sauget and part is in Cahokia. The culverts at both Queeny Avenue and Judith Lane have been blocked to prevent contaminated water from flowing into the lower portion of Dead Creek. CS-B is surrounded by a fence, restricting access to the site.

PUBLIC HEALTH IMPLICATIONS

SOIL

Surface and/or subsurface soil contamination exists at most sites within Area 1. Surface soils were analyzed only at site G and indicate gross contamination with volatile

organic compounds, semi-volatile organic compounds, polychlorinated biphenyls (PCBs), and metals (see table).

Forty of 43 surface soil samples at site G contained PCBs. Six of these contained PCBs at extremely high concentrations. Exposure to contaminants through contact with surface soil at site G is unlikely due to restricted access to the site. However, dust generation and volatilization present possible routes of exposure to surface soil contaminants.

Subsurface soils were sampled at sites G, H, I, and L. Contaminants were discovered at all of these sites (see table) with the highest concentrations at sites G and I. All subsurface contaminants in Area 1 sites were found at a depth of 3 feet or more. PCBs were detected in all Area 1 soil samples with the exception of site L.

Exposure to subsurface contaminants may occur through volatilization to the air or migration into the groundwater.

GROUNDWATER

The same organic contaminants were consistently detected across all Area 1 sites sampled (see table). The organic contaminants found in groundwater at the sites coincide with those found in subsurface soil samples.

Three residential wells on Judith Lane, south of Area 1 sites are contaminated with low-levels of organic compounds. Contaminants detected include toluene, ethylbenzene, carbon disulfide, and styrene. No semi-volatiles, pesticides, or PCBs were detected in the residential wells.

Area groundwater flow is generally south-southwest toward the river. The direction of groundwater flow, however, is influenced by the river level and process wells. Any wells between the river and the sites may potentially become contaminated. Contaminated groundwater may also lead to contaminant release into the river.

Domestic use of contaminated groundwater presents the most significant human exposure pathway. The following are various household activities that would contribute to contaminant exposure:

1) Drinking contaminated water;

2) Bathing or showering: exposed skin may absorb contaminants, and contaminants may vaporize from the water into the air;

3) Cooking: eating food cooked in contaminated water, and contaminants may vaporize from the water into the air while cooking; and

4) Other household activities: washing clothes and dishes, using humidifiers, and watering gardens with contaminated groundwater.

SURFACE WATER

Contaminated leachate and sediments have been observed entering the Mississippi River. Contaminated groundwater may also contribute to river

contamination. Exposure to these contaminants may occur directly during water sport activities and secondarily by the ingestion of contaminated fish and waterfowl.

AIR

On-site air samples have been taken from sites G and CS-B, and indicate site associated contaminants (see table). Phenanthrene was found in all samples taken from these sites. Compounds found in off-site samples were fluoranthene, naphthalene, nitroaniline, pyrene, and PCBs. Residents near Area 1 sites are at risk of exposure to airborne chemicals from Area 1 sites as well as other Sauget sites.

RECOMMENDATIONS

1) Monitoring of all private wells should be initiated or continued.

2) Further environmental characterization and sampling of affected areas on- and off-site are needed to better address environmental and human exposure pathways and determine possible remedial actions.

CHEMICALS OF CONCERN

SAUGET SITES - AREA 1

GROUNDWATER: Chemicals detected at levels of concern. This is not a list of all contaminants in the groundwater. (* chemical has USEPA standard for public water supply, and exceeds the standard.)

VOLATILE ORGANIC COMPOUNDS

carbon disulfide	ethylbenzene	styrene
toluene		

SEMI-VOLATILE COMPOUNDS

4-chloroaniline		

SOIL: Chemicals found in on-site surface and/or subsurface soil samples above levels of concern. This is not a list of all chemicals found in the soil.

VOLATILE ORGANIC COMPOUNDS

benzene	chlorobenzene	2,4-dichlorophenol
ethylbenzene	hexachlorobenzene	4-methyl-2-pentanone
naphthalene	tetrachloroethylene	toluene
1,2,4-trichlorobenzene	xylene	

SEMI-VOLATILE ORGANIC COMPOUNDS

benzo(a)pyrene	1,4-dichlorobenzene	pentachlorophenol
PCBs	pyrene	

INORGANIC COMPOUNDS

antimony	arsenic	barium
cadmium	chromium	cobalt
copper	cyanide	lead
mercury	nickel	silver
vanadium	zinc	

AIR: Chemicals found in on- and off-site air samples above levels of concern. This is not a list of all chemicals found in the air.

VOLATILE ORGANIC COMPOUNDS

naphthalene		

SEMI-VOLATILE ORGANIC COMPOUNDS

fluoranthene	nitroaniline	PCBs
phenanthrene	pyrene	

For more site-related public health information, contact:

Illinois Department of Public Health
Region 4
#22 Kettle River Drive
Edwardsville, Illinois 62025
(618) 656-6680

ILLINOIS DEPARTMENT OF PUBLIC HEALTH
A Healthier Today For A Better Tomorrow

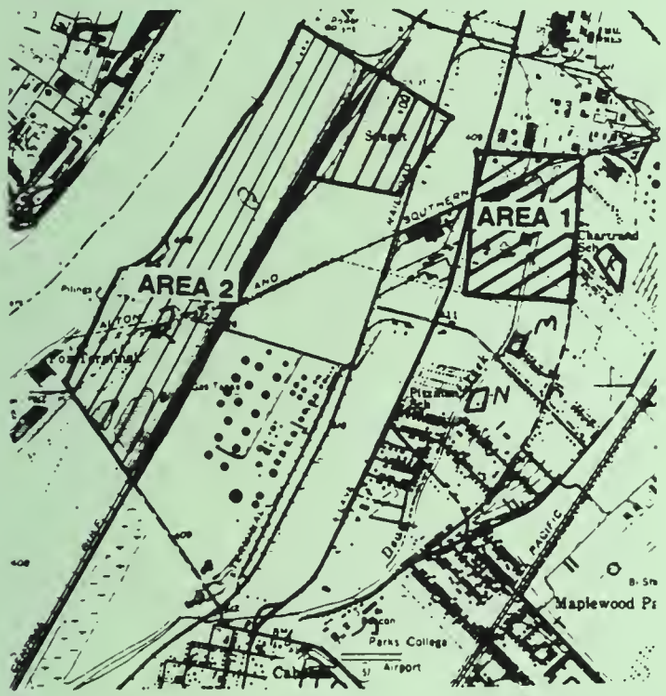
September 1991

Proposed Superfund Site: SAUGET SITES - AREA 2

The Sauget Sites are composed of 18 hazardous waste sites in and around Sauget, Illinois and are being evaluated for inclusion on the National Priority List (Superfund). These sites have been grouped by the Illinois Department of Public Health (IDPH) into Area 1, Area 2, and the Peripheral sites. IDPH, in conjunction with the Agency for Toxic Substances and Disease Registry, is evaluating each proposed Superfund site's potential to harm public health. This pamphlet is a summary of the findings, concerns, and recommendations for Area 2 Sauget Sites.

A site qualifies for the Superfund program when the U.S. Environmental Protection Agency (USEPA) determines that there is a release or threatened release of hazardous substances which may endanger public health, welfare, or the environment.

***** Do not trespass on Superfund sites *****



Sauget, Illinois
* Population within a three-mile radius: 75,248
* Number of sites in Area 2: 3
* Closest residents: Directly adjacent to some sites
* Residential and industrial areas adjacent to the sites

AREA 2 DESCRIPTION AND HISTORY

Area 2 consists of Sites O, Q, and R. All three sites are subsurface disposal areas located west of Highway 3, near the Mississippi River.

Site O covers approximately 45 acres along Mobile Avenue in Sauget. This site comprises four inactive sludge treatment lagoons and the Sauget Waste Water Treatment Plant (Treatment Plant). The former sludge lagoons are south of the Treatment Plant and occupy approximately 20 acres of the site. The lagoons have been covered with a clay cap and vegetated.

The Treatment Plant is owned by the city of Sauget and has been in operation since 1952. Approximately 10 million gallons of waste water are treated per day, 95% of which

comes from industrial sources. The plant has violated its operating permit several times in the past. Industries that contribute to the Treatment Plant include Monsanto Chemical Company (Monsanto), Cerro Copper, Sterling Steel Foundry, Amax Zinc, Rogers Cartage, Edwin Cooper, and Midwest Rubber.

Site Q is an unpermitted disposal area opened by Sauget and Company. The current owner, Riverport Terminal and Fleeting Company, currently leases the site to the Pillsbury Company. Disposal activities were completed at the site January 1975. A chain-link fence controls access to the northern portion of the site, but access is unrestricted in the southern part of the site.

Site R, located northwest of Site Q, is the Sauget Toxic Dump, also known as the Krummerich Landfill. The site is owned by Monsanto Chemical Company and was used as a landfill between 1957 and 1977. A Notification of Hazardous Waste Site filed by Monsanto indicates that the Krummerich Plant disposed of 290,000 cubic yards of organic and inorganic wastes, solvents, pesticides, and heavy metals at this site. Monsanto's Queeny Plant also filed a Notification of Hazardous Waste Site, indicating it disposed of 6,600 cubic yards of similar wastes on this site. Currently, a clay cap and vegetation cover the site. Access to the site is restricted by a chain-link fence and monitored by television cameras.

PUBLIC HEALTH IMPLICATIONS

SOIL

To date, no surface soil sampling has been done at Area 2 sites. However, subsurface soil samples have detected contaminants at all Area 2 sites (see table). Contaminants include volatile organic compounds (VOCs), semi-volatile organic compounds, and polychlorinated biphenyls (PCBs).

Exposure to subsurface contaminants may occur through volatilization to the air or migration into the groundwater.

GROUNDWATER

Organic contaminants were detected in groundwater from each site sampled (see table). Similar contaminants were consistently detected across Area 1 and Area 2 sites. The organic contaminants found in groundwater are also consistent with those detected in subsurface soil samples.

Area groundwater flow is generally south-southwest toward the river. The direction of groundwater flow, however, is influenced by the river level and process wells. Any wells between the river and the sites may potentially become contaminated. Contaminated groundwater may also lead to contaminant release into the river.

Domestic use of contaminated groundwater presents the most significant human exposure pathway. The following are various household activities that would contribute to contaminant exposure:

1) Drinking contaminated water;

2) Bathing or showering: exposed skin may absorb contaminants, and contaminants may vaporize from the water into the air;

3) Cooking: eating food cooked in contaminated water, and contaminants may vaporize from the water into the air while cooking; and

4) Other household activities: washing clothes and dishes, using humidifiers, and watering gardens with contaminated groundwater.

SURFACE WATER
Contaminated leachate and sediments from site R have been observed entering the Mississippi River at three locations. Leachate samples taken by the Illinois Environmental Protection Agency detected VOCs, semi-volatile organic compounds, and PCBs. Sediment samples taken from the locations where leachate is seeping into the river detected semi-volatile organic compounds and PCBs. Contaminated groundwater may also be contributing to river contamination.

Exposure to these contaminants may occur directly during water sport activities and secondarily by the ingestion of contaminated fish and waterfowl.

AIR
On-site air samples have been taken from sites Q and R, and indicate site associated contaminants (see table). Off-site samples from sites Q and R have detected VOCs, semi-volatile organic compounds, and PCBs. Residents near Area 2 sites are at risk of exposure to airborne chemicals from Area 2 sites as well as other Sauget sites.

ENVIRONMENTAL BIOTA
Fish samples taken downstream of site R by the United States Food and Drug Administration (USFDA) detected elevated concentrations of PCBs. Ingestion of contaminated fish and waterfowl may present possible routes of human exposure.

RECOMMENDATIONS

1) Monitoring of all private wells should be initiated or continued.

2) Further environmental characterization and sampling of affected areas on- and off-site are needed to better address environmental and human exposure pathways and determine possible remedial actions.

CHEMICALS OF CONCERN

SAUGET SITES - AREA 2

GROUNDWATER: chemicals detected at levels of concern. This is not a list of all contaminants in the groundwater. (* chemical has USEPA standard for public water supply, and exceeds the standard.)

VOLATILE ORGANIC COMPOUNDS

carbon disulfide	ethylbenzene	styrene
toluene		

SEMI-VOLATILE COMPOUNDS

4-chloroaniline		

SOIL: Chemicals found in on-site subsurface soil samples above levels of concern. This is not a list of all chemicals found in the soil.

VOLATILE ORGANIC COMPOUNDS

chlorobenzene	1,4-dichlorophenol	2,4-dichlorophenol
ethylbenzene	toluene	1,2,4-trichlorobenzene
xylene		

SEMI-VOLATILE ORGANIC COMPOUNDS

chrysene	2,3,7,8-TCDD	PCBs
pentachlorophenol	bis(2-ethylhexyl)phthalate	

LEACHATE AND SEDIMENT: Chemicals found in leachate and sediment samples above levels of public health concern. This is not a list of all chemicals found in the leachate and sediment.

VOLATILE ORGANIC COMPOUNDS

chlorobenzene	dichlorophenol	methylbenzene

SEMI-VOLATILE ORGANIC COMPOUNDS

benzoic acid	biphenoldiol	chloroaniline
chloronitrobenzene	chlorophenol	dichloroaniline
dioxins	furans	PCBs

AIR: Chemicals found in on- and off-site air samples above levels of concern. This is not a list of all chemicals found in the air.

VOLATILE ORGANIC COMPOUNDS

phenol	toluene	trichloroethane
xylene		

SEMI-VOLATILE ORGANIC COMPOUNDS

PCBs		

For more site-related public health information, contact:

Illinois Department of Public Health
Region 4
#22 Kettle River Drive
Edwardsville, Illinois 62025
(618) 656-6680

ILLINOIS DEPARTMENT OF PUBLIC HEALTH
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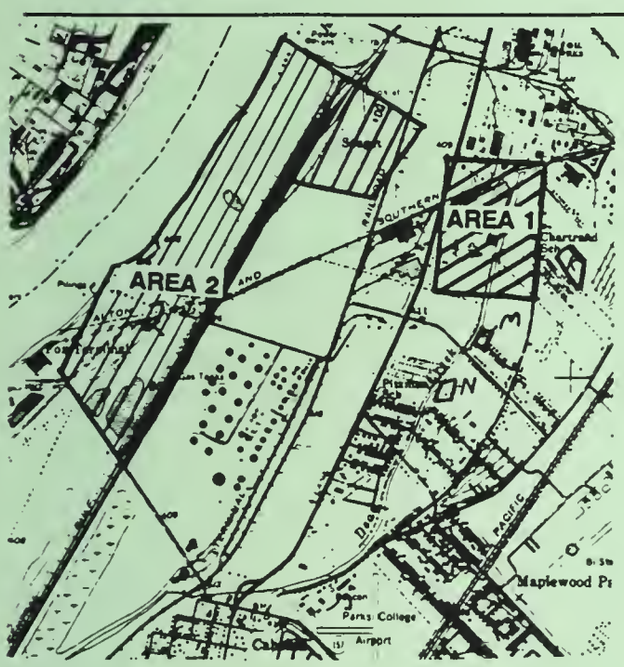
September 1991

Proposed Superfund Site: SAUGET SITES - PERIPHERAL SITES

The Sauget Sites are composed of 18 hazardous waste sites in and around Sauget, Illinois and are being evaluated for inclusion on the National Priority List (Superfund). These sites have been grouped by the Illinois Department of Public Health (IDPH) into Area 1, Area 2, and the Peripheral sites. IDPH, in conjunction with the Agency for Toxic Substances and Disease Registry, is evaluating each proposed Superfund site's potential to harm public health. This pamphlet is a summary of the findings, concerns, and recommendations for Peripheral Sauget Sites.

A site qualifies for the Superfund program when the U.S. Environmental Protection Agency (USEPA) determines that there is a release or threatened release of hazardous substances which may endanger public health, welfare, or the environment.

***** Do not trespass on Superfund sites *****



Sauget, Illinois
* Population within a three-mile radius: 75,248
* Number of Peripheral sites: 9
* Closest residents: Directly adjacent to some sites
* Residential and industrial areas adjacent to the sites

PERIPHERAL SITES DESCRIPTION AND HISTORY

The Peripheral sites include sites J, K, M, N, P, and Dead Creek Sectors C through F. These sites are located north-east of the Area 1 sites.

Site J, located on Sterling Steel Foundry (Sterling) property in northeastern Sauget, is divided into two sections. The northern section comprises two pits and a surface disposal area used by Sterling. The surface disposal area covers approximately 5 acres in the northeast corner of Sterling. A small pit situated within the surface disposal area is partially filled with casting sand. The southern section of site J is a large pit that is partially filled with casting sand and debris. The entire

property is surrounded by a chain-link fence limiting access.

Site K, located north of Queeny Avenue and east of Falling Springs Road in Sauget, is a former sand borrow pit that has been filled with unknown materials and covered with soil and gravel. It occupies approximately 6 acres and is presently vacant. Aerial photographs show that an excavation took place in the late 1940s. The excavation site was backfilled with unknown material by 1955 and re-excavated sometime in 1973. By 1979, the site was again backfilled with unknown materials. Several homes and mobile homes are located within 100 feet of the site. Access to Site K is unrestricted.

Site M is a pit located just east of Area 1's Dead Creek Sector-B (CS-B), approximately 300 feet north of Judith Lane. This borrow pit is owned by H.H. Hall Construction. Excavation of the pit began in the late 1940s. The pit is approximately 275 X 350 X 40 feet deep. The pit has been filled with water and joined to CS-B. Site M shows no visible signs of chemical dumping. It is surrounded by the same chain-link fence that surrounds CS-B, restricting access.

Site N is a partially filled 4-acre pit on an inactive construction yard in Cahokia southwest of Dead Creek. The site is owned by H.H. Hall Construction. The excavation began prior to 1950, and the pit has been partially filled with construction and demolition debris. Access to the site is restricted by a chain-link fence with a padlocked gate.

Site P covers approximately 20 acres in the northwestern part of Sauget. This site is an inactive landfill that was permitted by the Illinois Environmental Protection Agency (IEPA) and opened in 1972 by Sauget and Company. Access to the site is unrestricted.

Dead Creek Sectors C through F (CS-C, CS-D, CS-E, CS-F) are located south of Judith Lane. This section of Dead Creek runs through Cahokia and empties into the Prairie du Pont Floodway, which discharges to the Mississippi River. PCBs have been detected in surface water samples taken from all creek sectors. Children have been observed playing in these unrestricted creek areas.

PUBLIC HEALTH IMPLICATIONS

SOIL

Surface soils were sampled only at site J and indicate high level contamination with organic compounds and metals (see table). Exposure to contaminants through contact with surface soils is unlikely since access to site J is restricted. However, dust generation and volatilization present possible routes of exposure to surface soil contaminants at this site.

Subsurface soil contamination was identified at sites J, K, N, and P. Detected contaminants include volatile organic compounds (VOCs), semi-volatile organic compounds, and polychlorinated biphenyls (PCBs)(see table). Exposure to subsurface contaminants may occur through volatilization

to the air or migration into the groundwater.

GROUNDWATER
Organic contaminants were detected in groundwater from each peripheral site sampled. Sampling data, however, are unavailable at this time.

Area groundwater flow is generally south-southwest toward the river; however, the river level and process wells influence the direction. Any wells between the river and these sites may potentially become contaminated. Contaminated groundwater may also lead to contaminant release in the river.

Domestic use of contaminated groundwater presents the most significant human exposure pathway. The following are various household activities that would contribute to contaminant exposure:

1) Drinking contaminated water;

2) Bathing or showering: exposed skin may absorb contaminants, and contaminants may vaporize from the water into the air;

3) Cooking: eating food cooked in contaminated water, and contaminants may vaporize from the water into the air while cooking; and

4) Other household activities: washing clothes and dishes, using humidifiers, and watering gardens with contaminated groundwater.

SURFACE WATER
Surface water sampling has been limited; however, recent data indicate the presence of PCBs in surface water in all of the Peripheral sites creek sectors at levels of public health concern. Also, contaminants have been detected in the sediment samples of Dead Creek Sectors C and D (see table).

Exposure to these contaminants may occur directly during water sport activities; in addition children have been observed playing in these areas. Exposure to these chemicals may also occur through ingestion of contaminated fish and waterfowl.

AIR
To date, no air sampling data are available for any of the Peripheral Sites.

RECOMMENDATIONS

1) Monitoring of all private wells should be initiated or continued.

2) Further environmental characterization and sampling of affected areas on- and off-site are needed to better address environmental and human exposure pathways and determine possible remedial actions.

CHEMICALS OF CONCERN

SAUGET SITES - PERIPHERAL SITES

SOIL: Chemicals found in on-site surface and/or subsurface soil samples above levels of concern. This is not a list of all chemicals found in the soil.

	VOLATILE ORGANIC COMPOUNDS	
chlorobenzene	ethylbenzene	phenol
toluene	xylene	
	SEMI-VOLATILE ORGANIC COMPOUNDS	
benzo(a)pyrene	dibenzofuran	1,2-dichlorobenzene
1,4-dichlorobenzene	fluoranthene	PCBs
phenanthrene	pyrene	
	INORGANIC COMPOUNDS	
chromium	iron	manganese
nickel		

SURFACE WATER: Chemicals found in on-site surface water samples above levels of concern. This is not a list of all chemicals found in surface water.

	SEMI-VOLATILE ORGANIC COMPOUNDS	
PCBs		

SEDIMENT: Chemicals found in on-site sediment samples above levels of concern. This is not a list of all chemicals found in the sediment.

	VOLATILE ORGANIC COMPOUNDS	
phenol		
	SEMI-VOLATILE ORGANIC COMPOUNDS	
benzo(a)pyrene	chrysene	dichlorobenzene
fluoranthene	PCBs	phenanthrene
pyrene	trichlorobenzene	

For more site-related public health information, contact:

Illinois Department of Public Health
Region 4
#22 Kettle River Drive
Edwardsville, Illinois 62025
(618) 656-6680

ILLINOIS DEPARTMENT OF PUBLIC HEALTH
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September 1991

Superfund Site: TARACORP / NL INDUSTRIES

Taracorp/NL Industries (Taracorp) is one of 39 National Priority List (Superfund) hazardous waste sites in Illinois. The Illinois Department of Public Health (IDPH), in conjunction with the Agency for Toxic Substances and Disease Registry (ATSDR), is evaluating each Superfund site's potential to harm public health. This pamphlet is a summary of the findings, concerns, and recommendations for Taracorp.

A site qualifies for the Superfund program when the U.S. Environmental Protection Agency (USEPA) determines that there is a release or threatened release of hazardous substances which may endanger public health, welfare, or the environment.

***** Do not trespass on Superfund sites *****

Granite City, Illinois
* Population within three mile radius: ≈34,000
* Closest residents within 100 yards of site boundary
* Site is in industrial area

SITE DESCRIPTION AND HISTORY

The Taracorp site is located at 16th Street and Cleveland Boulevard in Granite City. This area is part of the Mississippi River flood plain known as the American Bottoms. The site is not, however, within the 100-year flood plain of the Mississippi River because of a levee system along the river. Taracorp currently operates metal refining and fabricating facilities on-site.

The site covers less than 18 acres; however, historic information shows that the Hoyt Metal Company (a previous owner) operated this same facility on 30 acres of land. Bordering the site are properties owned by Trust 454, Terminal Railroad Associates Inc., Illinois Central Gulf Railroad, Chicago and North-western Railroad, and Tri Cities Trucking Inc.

St. Louis Lead Recyclers is the present tenant on the land owned by Trust 454.

The site operations started in 1895 as Markle Lead Works, which manufactured lead shot and clay pigeons. In November 1900, most of the facility was destroyed by fire, and in 1901 the plant was rebuilt and included a lead smelter. Between 1901 and 1903, processes at the site included manufacturing lead shot, sealing wax, mixed metals, and rolled sheet metal, as well as dross refining. (Dross is the name given waste products or impurities from the surface of molten metal.) Sometime between 1895 and 1903, Hoyt Metals purchased the site from Markle Lead Works, and in 1903 United Lead purchased the smelter from Hoyt Metals. After 1903, secondary smelting capabilities were added. Secondary smelting is the process of smelting lead-bearing materials (other than ores) such as slag or matte (a by-product of smelting which contains metal sulfides and metal oxides). In 1928, NL Industries (formerly National Lead Company) acquired the smelter from United Lead. Battery recycling began in the 1950s. In 1979, NL Industries sold the site to it's present owner, Taracorp Industries.

Taracorp has a secondary smelter with the capacity to produce 22,000 tons of lead products per year. In 1983, Taracorp discontinued secondary smelting but continued to operate the metal refining and fabricating facilities at the site. Taracorp presently operates these facilities. On-site activities were greatly reduced in 1983 in an effort to reduce lead air emissions.

A slag storage area is located on the southern boundary of the site. A preliminary site assessment performed in May 1983 estimated the quantity of lead waste to be 200,000 tons. Most of this waste was in and around the slag storage area. The slag storage area is known to contain slag, metallic lead, lead oxide, cadmium, arsenic, iron oxide, silica, rubber and plastic battery cases, general refuse, drums, and matte.

St. Louis Lead Recyclers (SLLR) borders Taracorp on its southwest boundary. Built in 1980, SLLR was originally designed to reclaim lead from batteries. In 1982, SLLR reached an agreement with Taracorp which allowed them to recycle various materials from Taracorp. It has been estimated that SLLR processed approximately 11,000 tons of Taracorp's slag pile. Materials that could not be recycled (slag and hard rubber) were placed southwest of the slag pile. In June 1983, SLLR discontinued recycling lead from the slag pile.

PUBLIC HEALTH IMPLICATIONS

SOIL

Lead is the primary contaminant of concern in the soil both on- and off-site (see table). Arsenic, magnesium, and zinc were also found in on-site soil samples at levels above normal but still below levels of public health concern. Access to the site is restricted.

Contaminated soils on-site pose a potential health risk to on-site employees. Contaminated soils also pose a potential health hazard to on-site workers and nearby

residents during remedial activities (excavation of soils and the slag pile, grading, etc.).

Soil samples taken off-site by IDPH, the Illinois Environmental Protection Agency, and others have detected elevated levels of lead in soil surrounding the site. Because of these elevated lead levels, the area surrounding the site has been included in a heavy metals study being conducted by IDPH through a grant from ATSDR. This study will be instrumental in determining whether off-site soil contamination poses a health hazard to area residents. Contaminated soil may be ingested, primarily by children, or inhaled as dust.

SLAG PILE
Lead is the primary contaminant in the slag piles on-site. These piles also contain other heavy metals, such as arsenic, cadmium, chromium, and nickel (see table). The piles have been determined to be hazardous for lead and cadmium.

Surface runoff from the slag pile was tested and determined to be contaminated with large amounts of lead. The slag pile and its runoff may be a source of groundwater contamination at the site. The slag pile also presents a possible health hazard to employees and remedial workers on-site.

GROUNDWATER
Lead is the primary contaminant of concern in the groundwater on-site. Other heavy metals such as cadmium, chromium, and copper were also detected, but at lower levels (see table).

Off-site groundwater contamination is limited. Metals, the primary contaminants of concern, move slowly through groundwater, and since homes in the immediate area are connected to city water, exposure to contaminants from groundwater is unlikely.

AIR
Lead is the primary contaminant of concern in air around this site (see table). The main source of air contamination associated with the site is fugitive dust generated from the slag pile and surface soil on- and off-site. Fugitive dust levels have decreased considerably in the past years since the slag pile is no longer disturbed. Fugitive dust emissions from the site are expected to be sporadic and dependent on local weather conditions.

Discontinuation of smelting processes has greatly reduced air pollution from direct release of contaminants into the air.

Contaminated air presents a potential health hazard to on-site employees and nearby residents as well as workers during remedial activities.

RECOMMENDATIONS

1) Remediation of waste piles should be performed to reduce or eliminate exposure to waste pile contaminants.

2) Comprehensive biomonitoring should be performed on employees and residents surrounding the site to determine lead exposure associated with the site. This would include blood testing of residents and environmental surveys of their homes to determine other potential sources of lead exposure.

3) Precautionary measures should be taken by residents in the area to reduce exposure to lead in soil, especially by children. These measures should include: good hygiene practices, sodding of bare areas of soil, and washing root vegetables.

4) During remedial activities, optimal dust control measures should be used and appropriate protective clothing should be worn by workers.

5) In operations where site workers may be exposed, protective clothing should be worn.

6) Down-gradient monitoring wells adjacent to the site should be sampled on an annual basis to determine contaminant migration.

CHEMICALS OF CONCERN

TARACORP

GROUNDWATER: chemicals detected at levels of concern. This is not a list of all contaminants in the groundwater. (* chemical has USEPA standard for public water supply, and exceeds the standard.)

INORGANIC COMPOUNDS

barium*	cadmium*	chloride
chromium	copper*	fluoride*
iron	lead*	manganese
mercury*	nickel*	silver*
selenium*	sulfate*	zinc

SOIL: Chemicals found in on-site soil samples above levels of concern. This is not a list of all chemicals found in the soil.

INORGANIC COMPOUNDS

lead

SLAG PILE: Chemicals found in on-site slag pile samples above levels of public health concerns. This is not a list of all chemicals found in the slag piles.

INORGANIC COMPOUNDS

cadmium	lead

For more site-related public health information, contact:

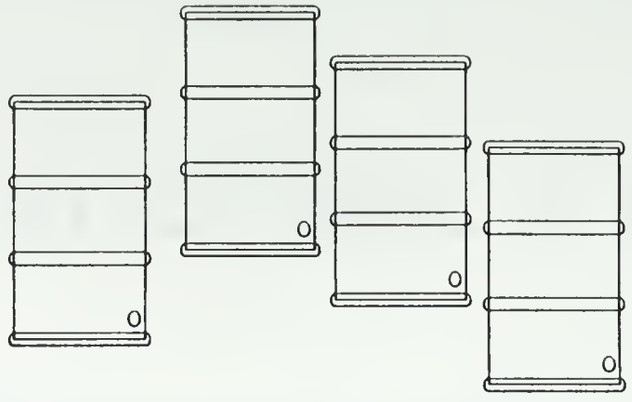
Illinois Department of Public Health
Region 4
#22 Kettle River Drive
Edwardsville, Illinois 62025
(618) 656-6680

TABLE 1-1
POISON EXPOSURE CASES
(IN ORDER OF FREQUENCY)

NONPHARMACEUTICALS	PHARMACEUTICALS
1. Cleaning substances	1. Analgesics
Bleaches (household)	Acetaminophen—pediatric
Anionic/nonionic cleaners, etc.	Acetaminophen—adult
2. Plants	Aspirin—adult; etc.
Nontoxic plants	2. Cold and cough preparations
Oxalate-containing plants	3. Vitamins
Gastrointestinal irritants, etc.	Multivitamins with iron
3. Cosmetics, personal care	Fluoride—pediatric; etc.
Perfume/cologne/ aftershave	4. Topicals
Hair care	5. Sedative–hypnotics, antipsychotics
Soaps (bar, hand, complexion), etc.	Benzodiazepines
4. Chemicals	Phenothiazines
5. Hydrocarbons	Barbiturates, long acting, etc.
Gasoline	6. Antimicrobials
Toluene/xylene	Antibiotics, etc.
6. Alcohols	7. Gastrointestinal preparations
Ethanol (excluding rubbing alcohol), etc.	8. Electrolytes/minerals
7. Bites and envenomations	Calcium salts, etc.
Bee/wasp/hornet, etc.	9. Stimulants and street drugs
8. Food products/food poisoning	10. Hormones and hormone antagonists
9. Insecticides	
10. Foreign bodies	

Adapted from Litovitz T, Normann SA, Veltri JC: 1985 annual report of the American Association of Poison Control Centers National Data Collection System. Am J Emerg Med 1986;4:427–458. Used with permission.

Source: Ellenhorn, et. al., Medical Toxicology. 1988



HAZARDOUS CHEMICALS

ACUTE
HIGH-LEVEL
EXPOSURE

CHRONIC
LOW-LEVEL
EXPOSURE

ACUTE HIGH-LEVEL EXPOSURE

* Occupational
* Environmental
* Intentional Abuse

CHRONIC LOW-LEVEL EXPOSURE

* Occupational
* Environmental
* Intentional Abuse

TABLE 34-9
COMPOUNDS DETECTED IN BLOOD SPECIMENS FROM POISONED PATIENTS, USING HEADSPACE GAS CHROMATOGRAPHY

COMPOUND	PRINCIPAL SOURCE
Acetone	Widely used solvent
Bromochlorodifluoromethane	Fire extinguishant
n-Butane	Bottled fuel gas
Carbon tetrachloride	Rarely used solvent—highly hepatotoxic
Chlorobutanol (chlorbutol)	Sedative/antimicrobial
Chloroform	Widely used laboratory solvent
Cryofluorane (dichlorotetrafluoroethane, Halon 114)	Aerosol propellant
Dichlorodifluoromethane (Halon 12)	Aerosol propellant, refrigerant
Ethanol	Alcohol
Ethyl acetate	Widely used solvent
Halothane	Anesthetic
Isobutane	Bottled fuel gas
Isopropanol	Antifreeze
Isopropyl nitrate	Stabilizer in 1,1,1-trichloroethane
Methyl ethyl ketone (Butanone)	Widely used solvent
Propane	Bottled fuel gas
Tetrachlorethylene (perchloroethylene)	Dry-cleaning fluid, degreasing agent
Toluene	Adhesives
1,1,1-Trichloroethane	Dry-cleaning fluid, degreasing agent, correcting fluids
2,2,2-Trichloroethanol	Trichloroethylene metabolite
Trichloroethylene	Dry-cleaning fluid, anesthetic
Trichlorofluoromethane (Halon 11)	Aerosol propellant

Adapted from Ramsey JD, Flanagan RJ: The role of the laboratory in the investigation of solvent abuse. Hum Toxicol 1982;1:300. Used with permission.

TABLE 3-2. Industrial Agents Associated with Adverse Effects on the Cardiovascular System

Agent	*Effect*	*Comments*
METALS		
Cadmium	? Hypertension	Hypertension observed in animals; renal toxicity in humans; occupational studies of hypertension have been negative
Arsenic	ECG abnormalities	Most studies of occupational cohorts show no increased CVD mortality.
Cobalt	Cardiomyopathy	"Beer drinkers" cardiomyopathy may involve other factors such as nutritional state, subclinical alcoholic heart disease.
Lead	? Hypertension	Relation to hypertension in humans is controversial; it may be secondary to renal effects.
SOLVENTS		
Methylene chloride	Cardiac ischemia	Metabolism to carbon monoxide; MI post exposure in case reports; chronic low level exposures not associated with excess mortality in one study
Carbon disulfide	ASHD	Multiple mortality studies show increased mortality from ischemic heart disease; first effect may be increased blood pressure or increased serum cholesterol with ASHD as secondary event
Chlorinated organic solvents (especially TCE)	Arrhythmias	Sudden death without pathologic findings in glue sniffers, but such high exposures not likely in industrial settings
Fluorocarbons	Arrhythmias	One study found various arrhythmias in pathology residents exposed during specimen preparation; sudden death reported from "sniffing" of aerosols
OTHER AGENTS		
Carbon monoxide	Cardiac ischemia ? ASHD	May explain strong association between smoking and ASHD; aggravates symptoms of ischemic heart disease but increased mortality has not been documented in occupationally exposed cohorts
Organonitrates	Cardiac ischemia secondary to vasospasm	Case reports of "Monday deaths" in explosives industry; coronary artery vasospasm probable mechanism; increased cardiovascular mortality after exposure greater than 20 years reported in one study

Source: Proctor, et. al., Chemical Hazards of the Workplace. 1988.

TABLE 34-10
COMPOUNDS AND POTENTIAL TOXIC COMPOUNDS OF INHALED ABUSE

Plastic (Styrene) cement	Toluene, acetone, hexane, trichloroethylene, benzene
Airplane model cements	Toluene, acetone, naphtha, hexane, alcohols, aliphatic acetates, tricresyl phosphate, and hexane
Rubber cement	Benzene, hexane, trichloroethylene
Spray paint and aerosol propellant	Fluorocarbons, trichlorethylene, toluene
Lacquer thinner	Toluene
Gasoline	Hydrocarbons, lead, tricresyl phosphate
Lighter fluid	Naphtha
Ink	Toluene, naphtha, xylene
Fingernail polish remover	Acetone, aliphatic acetates
Liquid shoe polish	Toluene, chlorinated hydrocarbons
Incense, room deodorizers	Butyl nitrite (amyl nitrite also abused for enhancement of sexual pleasure in the gay community)
Cleaning fluid	Trichloroethane, naphtha, perchloroethylene, trichloroethylene, carbon tetrachloride, toluene (small amounts usually), methylene chloride
Industrial solvents	Chlorinated hydrocarbons, hexane, toluene, benzene, aliphatic acetates
Anesthetics	Ether, nitrous oxide, trichloroethylene, chloroform

TABLE 3-1. Occupational Exposures Associated with Chronic Renal Failure

Agent	*Type of Study*	*Effects Observed*	*Comments*
Lead	Cross-sectional survey	Asymptomatic ↓ in GFR; correlated with body burden Pb (EDTA chelation); interstitial nephritis on bx	Effects observed without other clinical signs or symptoms
Cadmium	Cross-sectional	Tubular proteinuria (low MW proteins); renal stones	Proteinuria observed in absence of clinical nephropathy or other organ effects
Mercury	Case reports; cross-sectional surveys	Nephrotic syndrome; glomerulonephritis; proteinuria (high MW) correlated with UHg; β-galactocidase (blood/urine)	Proteinuria, increased enzyme activities observed without other clinical signs of Hg toxicity
Beryllium	Registry data	Renal stones; hypercalciuria	Renal effects not observed in absence of pulmonary disease
Carbon disulfide	Cross-sectional survey	↓ PAH clearance; ↓ renal blood flow	Renovascular effects may be secondary to generalized effect on sympathetic nervous system and hypertension
Silica	Case reports	Immune-mediated glomerulonephritis; interstitial nephritis	Renal effects only observed in generalized systemic disease (vasculitis/hypertension) after heavy exposure
Solvents	Case control (retrospective)	Glomerulonephritis (all types)	Specific agents not identified; retrospective data only; common exposure, but rare disease; idiosyncratic immune response?

Source: Proctor, et.al., Chemical Hazards of the Workplace. 1988.

TABLE 34-17
AGENTS THAT CAUSE CHRONIC BRONCHITIS[a]

Gases

Aldehydes (acrolein, formaldehyde)
Ammonia
Chlorine
Chloromethyl methyl ether
Osmium tetroxide
Phosgene
Toluene diisocyanate
Vinyl chloride monomer (probable)
Oxides of nitrogen (probable)

Particles

Cement dust
Chromium
Coal mine dust (bronchitis, emphysema)
Coke oven
Cotton dust
Diesel exhaust
Endotoxin
Grain dust (wheat, barley)
Pottery dust
Sodium hydroxide
Brick dust (probable)
Cadmium (probable)
Cobalt (probable)
Paraquat
Polychlorinated biphenyls (probable)
Tungsten carbide (probable)
Vanadium (probable)
Western red cedar
Wood dust

[a] Suspected but not proven causative agents are so indicated.

Adapted from Last JM (Ed): Maxcy-Rosenau: Public Health and Preventive Medicine, 11th ed. New York, Appleton–Century–Crofts, 1980, p 631. Used with permission.

TABLE 3-3. Industrial Agents/Processes Associated with Cancer in Humans*

Agent/Process	*Site*
4-Aminobiphenyl	Bladder
Arsenic and Trioxide compounds	Skin; lung; angiosarcoma; liver
Asbestos	Lung, mesothelioma, larynx, G.I.
Auramine (basic yellow 2)	Bladder
Benzene	Leukemia (acute nonlymphocytic)
Benzidine	Bladder
Bis (Chloromethyl) ether (BCME) and chloromethyl ether	Lung
Chromium and compounds	Lung; nasal sinuses
Coke oven emissions	Skin; lung; urinary tract
Hematite underground mining	Lung
Isopropyl alcohol manufacture	Lung; larynx; paranasal sinuses
Mustard gas	Lung
β-Naphthylamine	Bladder
Nickel and compounds; nickel refining	Lung; nasal passages; larynx
Soots, tars, and mineral oils	Skin; lung; bladder, G.I.
Vinyl chloride	Liver (angiosarcoma); lung; brain
Boot and shoe manufacture	Nasal sinuses; lung; bladder; leukemia
Furniture manufacture	Nasal sinuses
Rubber manufacture	Multiple sites

* Based on classification by International Agency for Research on Cancer (IARC) as carcinogenic to humans with sufficient epidemiologic evidence (Group 1) and by National Toxicology Program (NTP) as known to be carcinogenic with evidence from human studies (Group a).

Source: Proctor, et. al., Chemical Hazards of the Workplace. 1988.

HOSPITAL CHEMICAL HAZARDS

Waste Anesthetic Gases

Formaldehyde

Asbestos

Ethylene Oxide

Chemotherapeutic Agents

Cleaning & Disinfecting Solutions

Health Effects of Selected Indoor Pollutants

Pollutant	Possible Health Effects
Carbon Monoxide	Headache, nausea, unconsciousness, death
Nitrogen Oxides	Headache, nausea, pulmonary edema
Asbestos	Asbestosis, lung cancer, mesothelioma
Radon	Lung cancer
Formaldehyde	Eye and upper respiratory irritation, headaches, nausea, sensitization, cancer
Organic Compounds	Eye and respiratory irritation, headache, nausea, cancer
Particles (dust, spores, pollens, bacteria, viruses)	Allergic reactions, eye and upper respiratory irritations, cancer, infections

BASIC APPROACH TO EXPOSED PATIENT

Stabilization

Reduce absorption

Antidote (<5%)

Improve elimination

Complete patient evaluation

Continuing care and disposition

PATIENT DECONTAMINATION

(! Wear impermeable gloves and gowns)

Remove contaminated clothing

Irrigate eyes - 15 minutes

Skin - Rinse with cold water

Wash thoroughly

Repeat twice

Special treatment

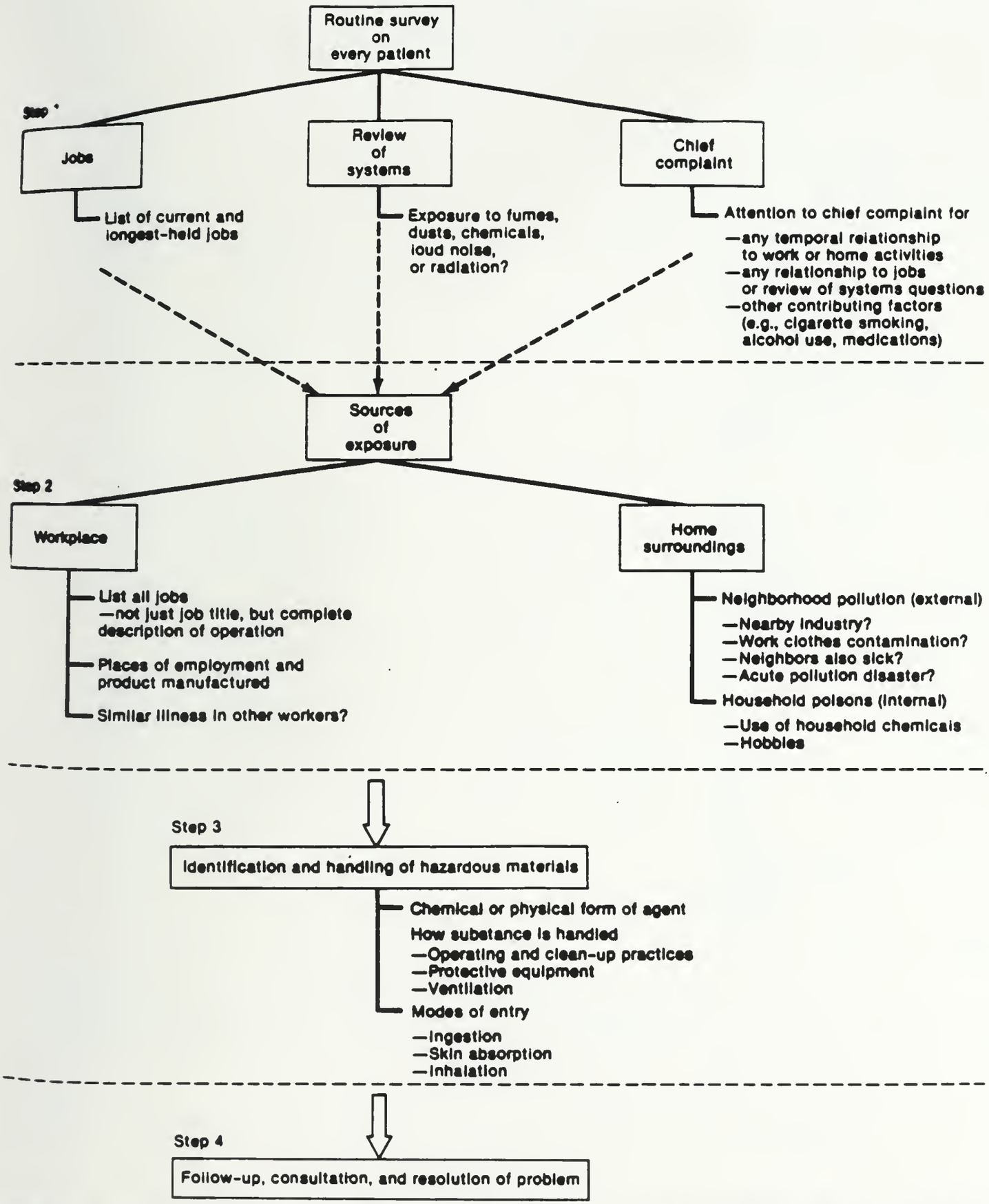


FIGURE 34-11. Systematic approach to history taking and diagnosis of occupational or environmental illness. Adapted from Goldman RH, Peters JH: The occupational and environmental health history. JAMA 1981;246:2832. Copyright 1981 American Medical Association. Used with permission.

Source: U.S. Department of Health and Human Services
Guidelines for Health Care Workers. 1988.

APPENDIX 3

OCCUPATIONAL HAZARDS BY LOCATION IN THE HOSPITAL*

Location	Hazard
Central supply	Ethylene oxide
	Infection
	Broken equipment (cuts)
	Soaps, detergents
	Steam
	Flammable gases
	Lifting
	Noise
	Asbestos insulation
	Mercury
Dialysis units	Infection
	Formaldehyde
Dental service	Mercury
	Ethylene oxide
	Anesthetic gases
	Ionizing radiation
	Infection
Food service	Wet floors
	Sharp equipment
	Noise
	Soaps, detergents
	Disinfectants
	Ammonia
	Chlorine
	Solvents
	Drain cleaners
	Oven cleaners
	Caustic solutions
	Pesticides
	Microwave ovens
	Steam lines
	Ovens
	Heat
	Electrical hazards
	Lifting
Housekeeping	Soaps, detergents
	Cleaners
	Solvents
	Disinfectants
	Glutaraldehyde
	Infection
	Needle punctures
	Wastes (chemical, radioactive, infectious)
	Electrical hazards
	Lifting
	Climbing
	Slips, falls
Laboratory	Infectious diseases
	Toxic chemicals
	Benzene
	Ethylene oxide
	Formaldehyde
	Solvents
	Flammable and explosive agents
	Carcinogens
	Teratogens
	Mutagens
	Cryogenic hazards
	Wastes (chemical, radioactive, infectious)
	Radiation
Laundry	Wet floors
	Lifting
	Noise
	Heat
	Burns
	Infection
	Needle punctures
	Detergents, soaps
	Bleaches
	Solvents
	Wastes (chemical and radioactive)

(Continued)

*Although this list is not exhaustive, it demonstrates the variety of hazards that can exist in a hospital environment. Stress is reported by hospital workers in all job categories and is not listed separately by location.

APPENDIX 3 (Continued)

OCCUPATIONAL HAZARDS BY LOCATION IN THE HOSPITAL*

Location	Hazard
Maintenance and engineering	Electrical hazards
	Tools, machinery
	Noise
	Welding fumes
	Asbestos
	Flammable liquids
	Solvents
	Mercury
	Pesticides
	Cleaners
	Ammonia
	Carbon monoxide
	Ethylene oxide
	Freons
	Paints, adhesives
	Water treatment chemicals
	Sewage
	Heat stress
	Cold stress (refrigeration units)
	Falls
	Lifting
	Climbing
	Strains and sprains
Nuclear medicine	Radionuclides
	Infection
	X-irradiation
Office areas and data processing	Video display terminals
	Air quality
	Ergonomic/body mechanics
	Chemicals
	Ozone
Operating rooms	Anesthetics
	Antiseptics
	Methyl methacrylate
	Compressed gases
	Sterilizing gases
	Infection
	Electrical
	Sharp instruments
	Lifting
Pathology	Infectious diseases
	Formaldehyde
	Glutaraldehyde
	Flammable substances
	Freons
	Solvents
	Phenols
Patient care	Lifting
	Pushing, pulling
	Slips, falls
	Standing for long periods
	Infectious diseases
	Needle punctures
	Toxic substances
	Chemotherapeutic agents
	Radiation
	Radioactive patients
	Electrical hazards
Pharmacy	Pharmaceuticals
	Antineoplastic agents
	Mercury
	Slips, falls
Print shops	Inks
	Solvents
	Noise
	Fire
Radiology	Radiation
	Infectious diseases
	Lifting
	Pushing, pulling

Source: U.S. Department of Health and Human Services
Guidelines for Health Care Workers. 1988.

APPENDIX 4

CHEMICALS ENCOUNTERED IN SELECTED HOSPITAL OCCUPATIONS*

Occupation and chemical
Clinical laboratory technologists and technicians (OC 080)+:
Acetic acid
Acetic anhydride
Acetone
Acrylamide
Ammonium chloride
Ammonium hydroxide
Ammonium lauryl sulfate
Aniline
Arsenic
Barbital
Barbituric acid, 5,5-diethyl-, sodium salt
Benzene
Benzethonium chloride
Benzidine
Benzoic acid
Benzyl alcohol
Biphenylol, sodium salt, 2-
Butanol
Butanone, 2-
Butyl acetate
Butyl alcohol, sec-
Butylamine
Caffeine
Carbon tetrachloride
Cetylpyridinium chloride
Chloroform
Cholesterol
Chromium trioxide
Citric acid
Cobaltous acetate
Copper (II) sulfate (1:1)
Cyclohexanone
Dichloroethane, 1,2-
Dichloromethane
Diethylamine

(Continued)

See footnotes at end of table.

APPENDIX 4 (Continued)

CHEMICALS ENCOUNTERED IN SELECTED HOSPITAL OCCUPATIONS

Occupation and chemical
Diethylene glycol
Dinitrophenylhydrazine, 2,4-
Dioxane, 1,4-
Diphenylamine
Dipropylene glycol monoethyl ether
Ethanol, 2-butoxy
Ethyl alcohol
Ethylene glycol
Ethylenediaminetetraacetic acid
Ethylenediaminetetraacetic acid, sodium salt
Ethylenediaminetetraacetic acid, tetrasodium salt
Ethylene oxide
Ferrous sulfate
Formaldehyde
Formamide, N,N-dimethyl
Galactose
Glutaraldehyde
Glycerol
Hydrazine sulfate
Hydroxylamine
Isopropyl acetate
Isopropyl alcohol
Isopropylamine
Lactic acid
Lactose
Lead acetate
Leucine
Lithium
Lithium carbonate
Lithium chloride
Magnesium chloride
Maleic acid
Maleic anhydride
Manganese chloride
Mercaptoethanol, 2-
Mercury, ((o-carboxyphenyl) thio) ethyl-, sodium salt

(Continued)

See footnotes at end of table.

APPENDIX 4 (Continued)

CHEMICALS ENCOUNTERED IN SELECTED HOSPITAL OCCUPATIONS

Occupation and chemical
Mercuric chloride
Methanol
Methoxyethanol, 2-
Methyl paraben
Methyl-2-pentanone, 4-
Naphthol, alpha-
Naphthylamine, alpha-
Nitrilotriethanol, 2,2',2"-
Nitrobenzene
Oxalic acid
Pentanediol, 1,5-
Pentyl alcohol
Phenol
Phosphoric acid
Piperidine
Potassium chloride
Potassium cyanide
Potassium hydroxide
Propanol, 1-
Propionic acid
Propylene oxide
Pyridine
Pyrogallic acid
Resorcinol
Silver nitrate
Sodium acetate
Sodium azide
Sodium benzoate
Sodium carbonate
Sodium chloride
Sodium dodecylbenezenesulfonate
Sodium hypochlorite
Sodium iodide
Sodium nitrate
Sodium nitrite
Sodium phosphate, dibasic

(Continued)

See footnotes at end of table.

APPENDIX 4 (Continued)

CHEMICALS ENCOUNTERED IN SELECTED HOSPITAL OCCUPATIONS

Occupation and chemical
Sorbic acid
Stearic acid
Succinic acid
Sulfanilamide
Sulfur dioxide
Sulfuric acid
Thioacetamide
Thiosemicarbazide
Thiourea
Toluene
Toluidine, ortho-
Trichloroacetic acid
Trichloroethane, 1,1,1-
Trichloroethylene
Tungstic acid
Urea
Xylene
Zinc oxide
Zinc sulfate (1:1)
Cleaners and charpersons (OC 902):
Acetic acid
Acetone
Acrylic acid, ethyl ester
Acrylontrile
Ammonium chloride
Ammonium hydroxide
Benzene
Benzoic acid
Benzothiazolethiol, 2-
Biphenylol, sodium salt, 2-
Butanol
Butanone, 2-
Butyl acetate
Carbon tetrachloride
Chloroform

(Continued)

See footnotes at end of table.

APPENDIX 4 (Continued)

CHEMICALS ENCOUNTERED IN SELECTED HOSPITAL OCCUPATIONS

Occupation and chemical
Chromium trioxide
Citric acid
Copper (II) sulfate (1:1)
Coumarin
Cyclohexanol
Dichloromethane
Dioxane, 1,4-
Dipropylene glycol monomethyl ether
Ethanol, 2-(2-ethoxyethoxy)-, acetate
Ethanol, 2-butoxy-
Ethoxyethanol, 2-
Ethyl alcohol
Ethyl ether
Ethylene glycol
Ethylene oxide
Ethylenediaminetetraacetic acid
Ethylenediaminetetraacetic acid, disodium salt
Ethylenediaminetetraacetic acid, tetrasodium salt
Formaldehyde
Glycerol
Glycolic acid
Isopropyl alcohol
Lactic acid
Maleic anhydride
Methanol
Methyl methacrylate
Methyl salicylate
Morpholine
Nitrilotriethanol, 2,2', 2"-
Nonylphenol
Oxalic acid
Pentanediol, 1,5-
Pentylphenol, para-tert
Phenol
Phenol, 4-chloro-2-cyclopentyl-
Phenylmercuric acetate

(Continued)

See footnotes at end of table.

APPENDIX 4 (Continued)

CHEMICALS ENCOUNTERED IN SELECTED HOSPITAL OCCUPATIONS

Occupation and chemical
Phosphoric acid
Phosphoric acid 2,2-dichloro-vinyl dimethyl ester
Phosphorothioic acid, 0,0-diethyl 0-(2-isopropyl-6-methyl-4-pyrimidinyl) ester
Phthalic acid, dibutyl ester
Potassium chloride
Potassium hydroxide
Propanediol, 1,2-
Propylene glycol monomethyl ether
Propylene oxide
Salicylic acid
Sodium carbonate
Sodium chloride
Sodium dodecylbenzenesulfonate
Sodium hypochlorite
Sodium lauryl sulfate
Sodium metasilicate
Sodium (I) nitrate
Sodium nitrite
Stearic acid
Styrene
Sulfuric
Tetrachloroethylene
Toluene
Triazine-2,4,6, (1H, 3H, 5H)-trione, 1,3-dichloro-, potassium salt, S-
Trichloroethane, 1,1,1-
Urea
Xylene
Zinc chloride
Zinc oxide
Zinc sulfate

(Continued)

See footnotes at end of table.

APPENDIX 4 (Continued)

CHEMICALS ENCOUNTERED IN SELECTED HOSPITAL OCCUPATIONS

Occupation and chemical
Health aides, excluding nursing (OC 922):
Acetic acid
Acetone
Ammonium hydroxide
Benzene
Benzidine
Benzoic acid
Biphenylol, 2-, sodium salt
Caffeine
Chloroform
Chromium trioxide
Citric acid
Copper sulfate
Diethylamine
Ethanol, 2-butoxy-
Ethyl alcohol
Ethyl ether
Ethylene oxide
Ethylenediaminetetraacetic acid
Formaldehyde
Glycerol
Hexamethylenetetramine
Hydrazine sulfate
Isopropyl alcohol
Lactose
Leucine
Lithium carbonate
Magnesium chloride
Menthol
Mercaptoethanol, 2-
Mercuric chloride
Mercury, ((o-carboxyphenyl) thio) ethyl-, sodium salt
Methanol
Methyl salicylate
Methyl-2-pentanone, 4-
Naphthol, alpha-

(Continued)

See footnotes at end of table.

APPENDIX 4 (Continued)

CHEMICALS ENCOUNTERED IN SELECTED HOSPITAL OCCUPATIONS

Occupation and chemical
Oxalic acid
Pentanediol, 1,4-
Pentylphenol, para-tert-
Phenobarbital
Phenol
Phosphoric acid
Potassium chloride
Potassium hydroxide
Potassium permanganate
Propylene glycol
Pyridine
Pyrogallic acid
Resorcinol
Salicylic acid
Silver nitrate
Sodium acetate
Sodium benzoate
Sodium carbonate
Sodium chloride
Sodium dodecylbenzenesulfonate
Sodium hypochlorite
Sodium lauryl sulfate
Sodium metasilicate
Sodium nitrate
Sodium nitrite
Sodium phosphate, dibasic
Sodium salicylate
Stearic acid
Styrene
Sulfuric acid
Thiopentyl sodium
Thiosemicarbazide
Toluene
Trichloroethane, 1,1,1-
Trichloroethylene

(Continued)

See footnotes at end of table.

APPENDIX 4 (Continued)

CHEMICALS ENCOUNTERED IN SELECTED HOSPITAL OCCUPATIONS

Occupation and chemical
Urea
Xylene
Zinc oxide
Health aides, orderlies, and attendants (OC 925):
Acetic acid
Acetone
Aluminum hydroxide
Ammonium chloride
Ammonium hydroxide
Ammonium lauryl sulfate
Benzethonium chloride
Biphenylol, 2-, sodium salt
Butyl acetate
Carbon tetrachloride
Citric acid
Copper sulfate
Coumarin
Dichloromethane
Diethylene glycol
Dimethoxane
Ethanol, 2-butoxy-
Ethanol, 2-ethoxy-
Ethyl alcohol
Ethyl ether
Ethylene glycol
Ethylene oxide
Ethylenediaminetetraacetic acid
Ethylenediaminetetraacetic acid, tetrasodium salt
Formaldehyde
Glycerol
Glycolic acid
Isopropyl alcohol
Isopropyl myristate
Lactose
Menthol

(Continued)

See footnotes at end of table.

APPENDIX 4 (Continued)

CHEMICALS ENCOUNTERED IN SELECTED HOSPITAL OCCUPATIONS

Occupation and chemical
Mercuric chloride
Mercury, ((o-carboxyphenyl) thio) ethyl-, sodium salt
Methanol
Methoxyflurane
Methyl salicylate
Methylparaben
Nitrilotri-2-propanol, 1,1',1"-
Nitrilotriethanol, 2,2"-
Pentanediol, 1,5-
Phosphoric acid
Phthalic acid, dibutyl ester
Potassium chloride
Potassium hydroxide
Potassium permanganate
Propylene glycol
Propylene glycol monomethyl ether
Quartz
Salicylic acid
Silver nitrate
Sodium acetate
Sodium carbonate
Sodium chloride
Sodium dodecylbenzenesulfonate
Sodium hypochlorite
Sodium lauryl sulfate
Sodium metasilicate
Sodium nitrate
Sodium nitrite
Stearic acid
Styrene
Sulfuric acid
Tetrachloroethylene
Trichloroacetic acid
Trichloroethane, 1,1,1-
Trichloroethylene

(Continued)

See footnotes at end of table.

APPENDIX 4 (Continued)

CHEMICALS ENCOUNTERED IN SELECTED HOSPITAL OCCUPATIONS

Occupation and chemical
Urea
Xylene
Zinc oxide
Practical nurses (OC 926):
Acetic acid
Acetone
Aluminum hydroxide
Ammonium chloride
Ammonium hydroxide
Benzene
Biphenylol, 2-, sodium salt
Citric acid
Clorpromazine hydrochloride
Copper sulfate
Coumarin
Dichloromethane
Ethyl alcohol
Ethyl ether
Ethylene oxide
Ethylenediaminetetraacetic acid
Ethylenediaminetetraacetic acid, tetrasodium salt
Formaldehyde
Glycerol
Isopropyl alcohol
Isopropyl myristate
Lactose
Menthol
Mercuric chloride
Mercury, ((o-carboxyphenyl) thio) ethyl-, sodium salt
Methanol
Methoxyflurane
Methyl salicylate
Methyl-2-pentanone, 4-
Methylparaben
Nitrilotri-2-propanol, 1,1'1"-

(Continued)

See footnotes at end of table.

APPENDIX 4 (Continued)

CHEMICALS ENCOUNTERED IN SELECTED HOSPITAL OCCUPATIONS

Occupation and chemical
Nitrilotriethanol, 2,2',2"-
Nitrofurazone
Pentanediol, 1,5-
Phenol
Phosphoric acid
Potassium hydroxide
Potassium permanganate
Propylene glycol
Quartz
Salicylic acid
Silver nitrate
Sodium acetate
Sodium carbonate
Sodium chloride
Sodium dodecylbenzenesulfonate
Sodium hypochlorite
Sodium iodide
Sodium lauryl sulfate
Sodium metasilicate
Sodium nitrate
Sodium nitrite
Stearic acid
Styrene
Tetrachloroethylene
Toluene
Trichloroethane, 1,1,1-
Urea
Zinc oxide

*Source: NIOSH (1984). Adapted from Report of the DSHEFS Task Force on Hospital Safety and Health. Cincinnati, OH: U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control, National Institute for Occupational Safety and Health, NIOSH Internal Report.
+Bureau of Census occupational code.

ATSDR

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Health Effects Found at North Carolina Incinerator Prompt Investigation

The report of a joint task force formed by the U.S. Environmental Protection Agency (EPA) and the Occupational Safety and Health Administration (OSHA) says that commercial incinerators are responsible for a number of violations that could threaten the health of workers and nearby residents. The task force, which inspected a number of commercial incinerators, was formed after an ATSDR health advisory reported a significant threat to human health at such a facility in Lenoir, North Carolina (see *The CSI Story*, right).

In April 1990, EPA requested that ATSDR evaluate health complaints reported by former employees and their families, and by residents living near the former Caldwell Systems Inc. (CSI) incinerator. The investigation explored allegations of improper work practices, neurological disease in four former CSI workers, and respiratory symptoms and disease among nearby residents. The findings led ATSDR to issue a health advisory to the Administrator of EPA in July 1990, warning of hazardous past work practices at CSI. Recommendations made in the advisory included further study of the extent of contamination and human exposure; restricted access to the facility and adjacent areas; and follow-up activities at other sites that might be expected to have similar problems, specifically, facilities that handled some of the hazardous wastes formerly burned at CSI.

EPA-OSHA investigators inspected 29 incinerators, including all incinerators that dispose of hazardous waste from Superfund sites. (The CSI incinerator was burning Superfund waste at the time of the alleged violations.) No health studies or emissions monitoring were conducted as part of the investigation. The greatest number of violations were related to worker health and safety. The report recommends changes in monitoring and additional training for facility operators. In future inspections, guidelines developed by the task force, which include employee interviews, will be used.

For more information about the Task Force Report on Evaluation of Compliance with On-Site Health and Safety Requirements at Hazardous Waste Incinerators, contact Suzanne Durham, EPA, 345 Courtland Street, NE, Atlanta, Georgia 30365; telephone (404) 347-7791.

The CSI Story

Built in 1976, the Lenoir, North Carolina, incinerator was owned and operated by Caldwell County to burn waste from the furniture industry. Varnish, paint, glues, lacquer, toluene, xylene, and other halogenated and nonhalogenated solvents from the furniture industry in western North Carolina were burned beginning in 1977, making up 90 percent of the waste stream handled by the facility. The incinerator was leased to a private company, Caldwell Systems Inc. (CSI), in mid-1977. Soon after the plant was leased to CSI, the company began to transport waste from other states to Lenoir for incineration.

Waste torpedo fuel (Otto Fuel II) from the Navy made up 10 percent of the total material burned. The fuel consists of propylene glycol dinitrate (76 percent) and two stabilizers, 2-nitrodiphenylamine (1.5 percent) and dibutyl sebucate (22.5 percent). Cyanide gas (10 to 1,000 ppm) was also present in the waste fuel. Workers allege that the torpedo fuel caused their severe headaches, lightheadedness, and nausea. According to former CSI workers, from as early as 1982 (and possibly before), torpedo fuel was burned an average of one or two times per week until incinerator

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operations ceased in May 1988. Because workers were exposed to many chemicals mixed together in varying proportions, it is not possible to blame the torpedo fuel or any single chemical for health effects.

Under the terms of the Resource Conservation and Recovery Act (RCRA), North Carolina licensed the incinerator as an interim status facility to incinerate hazardous chemical wastes. The plant closed in May 1989 after several fires, one of which forced the evacuation of residents living near the plant. CSI continued to operate the plant as a waste blending, bulking, and storage facility until December 1989.

During a health survey of the population living around the site, including former CSI workers and their household contacts, ATSDR and the National Institute for Occupational Safety and Health (NIOSH) talked with local residents in July 1990 to identify prevailing health concerns. Residents reported respiratory, arthritic, and allergic symptoms, as well as eye and airway irritation. Coughing, wheezing, and sputum production were the most frequently encountered symptoms. Residents noted that the smoke and odors from the incinerator were worse at night; many kept windows closed as they slept.

During the initial ATSDR investigation, former CSI workers reported daily dermal and respiratory contact with the chemicals. They also reported that no protective garments or respirators were provided for the first 60 days of employment; thereafter, Tyvek suits, with a 5-minute breakthrough time for toluene, were worn all day. The men reported that they frequently waded in the waste, and some workers cleaned out tank trucks without using respirators. Serious neurological problems consistent with toxic encephalopathy were reported by 14 workers. Four individuals who had extensive contact with solvents and waste torpedo fuel for periods ranging from 17 months to 3 years all exhibited neurologic signs and symptoms. Contaminated work garments were worn home to be laundered. The workers expressed concern about respiratory problems among household members, especially asthma among children.

For more information about the ATSDR-NIOSH health study, contact Michael Straight, MD, 1600 Clifton Road, NE, Mailstop E31, Atlanta, Georgia 30333; telephone (404) 639-0563.

Information Resources

The "Ideal" Information System: Cheap, Easy, Familiar

What would an ideal information system for toxic health effects be like? According to a recent report that assessed the effectiveness of one such system, it would provide meaningful, comprehensive, relevant, and up-to-date information to all levels of potential users—from the highly trained researcher to the layperson. The system would be well publicized, easily accessible, and available at a nominal cost.

The topic of the report is the National Library of Medicine's (NLM's) TOXicology Data NETwork (TOXNET), the primary health effects information inventory supported by ATSDR. In 1978, the National Library of Medicine (NLM) began compiling a databank of factual information on the health effects of toxic compounds called the Toxicology Data Bank (TDB). With funding from ATSDR and other sponsors, TDB grew and, in 1985, was incorporated into a new data bank called the Hazardous Substance Data Bank (HSDB). HSDB is bundled with other databases, files, and search software, which are collectively known as TOXNET.

ATSDR became involved with NLM's databank as part of the Agency's Literature Inventory and Dissemination (LID) program. The LID program was created by a Superfund mandate to "establish and maintain a comprehensive and publicly accessible inventory of literature, research, and studies on the health effects of toxic substances."

Because of a dramatic increase in the number of people interested in health effects information available on

hazardous substances & Public Health

Hazardous Substances and Public Health is published by the Agency for Toxic Substances and Disease Registry. The contents are in the public domain and may be reproduced and distributed without permission. The staff welcomes contributions and comments from readers. All correspondence should be addressed to: Managing Editor, Hazardous Substances and Public Health, Agency for Toxic Substances and Disease Registry, 1600 Clifton Road, NE, Mailstop E33, Atlanta, Georgia 30333, phone (404) 639-0736; fax (404) 639-0746.

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TOXNET in recent years, ATSDR contracted in 1989 with the Research Triangle Institute (RTI) to evaluate how well the Agency's LID program activities were meeting the congressional mandate and ATSDR's overall goals. After conducting a series of informal, unstructured discussions with current and potential users, RTI developed recommendations for program improvement.

The report identified three main issues: a preference for other information resources, such as printed sources and personal contacts; difficulty in using TOXNET; and ignorance of the system's availability. In general, the cost of any online information retrieval system is another important factor that clearly influences its use; the majority of potential users discussed limited financial resources as a main concern in the purchase and use of computerized systems.

All users agreed that online information resources are only one of several sources used. One of the most important advantages cited regarding personal contacts is that authorities in the environmental health field can offer data interpretation and advice. Infrequent computer users preferred a contact number with a person rather than a computer system.

The RTI report concludes that the ATSDR LID Program is meeting the inventory part of the congressional mandate and that the current program provides access to the health effects information inventory for a technically trained segment of the public. However, a larger segment of the public, who could benefit, currently lack access.

For a copy of the report or for further information, contact Jim Carpenter, ATSDR, 1600 Clifton Road, NE, Mailstop E33, Atlanta, GA 30333; telephone (404) 639-0736.

From The States...

California

A course on pediatric environmental health developed in California is believed to be the first of its kind. The California Department of Health Services and the California Public Health Foundation, through a cooperative agreement with ATSDR, have developed training programs on pediatric environmental health issues for physicians, nurses, and other health care professionals. From January through June 1991, the Department presented the following modules of its environmental health curriculum, "Kids and the Environment: Toxic Hazards," to the Pediatric Residency Training Program at Children's Hospital in Oakland:

- "The Basics: Epidemiology and Toxicology"
- "A Child Development Approach to Environmental Health"
- "History-Taking and the Home Audit"
- "Pesticides and Children"
- "Air Pollution and its Effects on Children"
- "Doctor, What Is the Answer?"

Four other modules concern lead and heavy metals; working children and occupational exposures; legal issues for pediatricians; and pediatricians' role in environmental health.

The training sessions, conducted at noon conferences, include case studies, discussions, slide presentations, and reference materials. The effectiveness of the modules is assessed through pre- and posttests and behavioral surveys. Each resident receives a complete course syllabus that is the most complete compendium of pediatric environmental health available.

California's program offers another method of environmental health instruction, a videotape series entitled "Clinical Issues in Environmental Health." The 7-tape series was created to help health care providers:

- develop clinical skills in environmental health and epidemiology;
- respond to patient concerns with up-to-date-information;
- teach their staffs about current issues of public health concern; and
- earn continuing medical education (CME) credit.

The tapes feature presentations by leading authorities on environmental health. They have been requested by state health departments, other health agencies, private corporations, the Navy, and several ministries in other countries.

For more information, please contact Joy E. Carlson, M.P.H., or Cameron Martel of the Environmental Epidemiology Training Project, 5900 Hollis St., Suite E, Emeryville, CA 94608; telephone (415) 540-3657.

Kansas

A furry friend from the forest is helping teach children in Kansas about the importance of maintaining a healthy environment. The project, "Healthy Kansans, Healthy Kids," features a squirrel named H.K. Through a variety of educational materials, H.K. promotes protection of the environment by encouraging people to participate in environmental healthy activities and to learn more about environmental health issues.

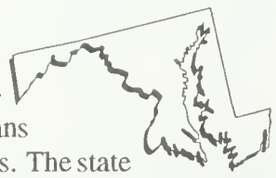
The resources developed for the program include a videocassette of 30-second public service announcements produced by a local television network; a 1992 environmental awareness coloring calendar; a health and environmental awareness bookmark; and a series of environmental awareness and action fact sheets, such as "Reduce and Recycle Waste at Home," and "Environmental Children's Activity Guide."

The Healthy Kansans, Healthy Kids materials examine a wide range of environmental topics: recycling, energy conservation, wildlife, water, soil, plants, trees, air, food chains, environmental hazards, and household hazardous waste.

According to health promotion administrator Jenny Ransom, children and adults have responded enthusiastically to these educational materials: "Environmental health education benefits young children because it establishes a basic understanding and an appreciation for the preservation of the environment."

The printed materials are available free of charge, though quantities may be limited. For additional information, contact Jenny Ransom, M.A., Health Promotion Administrator, Office of Health and Environmental Education, Kansas Department of Health and Environment, Landon State Office Building, 10th Floor, 900 SW Jackson, Topeka, KS 66612-1290; telephone (913) 296-1229.

Maryland



The Maryland Department of the Environment produces presentations on a number of environmental health topics to educate physicians and other health care professionals. The state offers grand rounds programs on such topics as "Environmental Health for Practicing Physicians," "Prevention of Environmental Diseases and Cancer," and "Update on Lead Poisoning Prevention." For county health department staff members, Maryland conducts seminars on lead poisoning prevention. Since January 1991, more than 200 health professionals have been reached.

Maryland has also produced pamphlets and other printed materials for environmental health education through its cooperative agreement with ATSDR. The pamphlets are provided to health care professionals for distribution to their patients and clinics. Some examples of titles on lead poisoning prevention include:

- "Preventing Lead Poisoning: What Every Parent Should Know" (written for parents and caregivers of young children; presents general guidelines for preventing lead poisoning);
- "Keep Your Home Lead Safe" (written for parents and caregivers of young children; offers review of common lead hazards);
- "Be Lead Smart Before Your Baby Is Born" (written for pregnant women; discusses prevention of prenatal exposure to lead).

Other printed materials produced by the state include a 7-part series entitled "Lead Paint Hazard Fact Sheets." The series was created for contract and property owners responsible for conducting abatement projects; for inspectors representing health, environment, housing, or other designated agencies; and for abatement workers. The fact sheets are intended to supplement relevant regulations and to highlight primary areas of concern.

For more information, please contact Boon Lim, M.D., M.P.H., State of Maryland, Department of the Environment, 2500 Broening Highway, Baltimore, MD 21224; telephone (301) 631-3852.

Calendar

September

Sept. 20-25: National Association of Community Health Centers, Inc. 22nd Annual Convention and Community Health Institute, San Francisco, California. *Contact:* Kathy Kunkler, Meetings Manager, NACHC, 1330 New Hampshire Ave., N.W., Suite 122, Washington, D.C. 20036; telephone (202) 659-8008.

Sept. 23-26: Hydrocarbon Contaminated Soils: Analysis, Fate, Environmental and Public Health Effects, Remediation, and Regulation, Amherst, Massachusetts. *Contact:* Linda Rosen, Conference Coordinator, University Conference Services CS92-4N, 918 Campus Center,

University of Massachusetts, Amherst, MA 01003; telephone (413) 545-2934.

Sept. 23-27: Dioxin '91: 11th International Symposium on Chlorinated Dioxins and Related Compounds, Research Triangle Park, North Carolina. *Contact:* Sharon Johnson Wills, Program Assistant, Office of Continuing Education, University of North Carolina School of Public Health, CB# 8165, Miller Hall, Chapel Hill, NC 27599-8165; telephone (919) 966-1104.

Sept. 25-28: Fourth International Congress on Environmental Lung Disease, Montreal, Quebec, Canada. *Contact:* American College of Chest Physicians, 3300 Dundee Rd., Northbrook, IL 60062; telephone (708) 698-2200.

October

Oct. 6-9: Health Risk Analysis: Assessment, Management, Communication, Des Moines, Iowa. *Contact:* National Environmental Health Association, 720 S. Colorado Blvd., Suite 970, South Tower, Denver, CO 80222; telephone (303) 756-9090.

Oct. 7-8: Preventing Childhood Lead Poisoning, Washington, D.C. *Contact:* Janet A. Phoenix, Alliance To End Childhood Lead Poisoning, 600 Pennsylvania Ave., SE, Suite 100, Washington, DC 20003; telephone (202) 543-1147.

Oct. 15-16: Illinois Environmental Health Association Annual Education Conference, Springfield, Illinois. *Contact:* Diana Johnston, Illinois Environmental Health Association, c/o Illinois Department of Public Health, Division of Environmental Health, 525 West Jefferson St., Springfield, IL 62761; telephone (217) 782-5830.

Oct. 22-24: Making Prevention a Reality, Washington, D.C. *Contact:* Jack Friel, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control, 1600 Clifton Rd., NE, Mailstop K43, Atlanta, GA 30333; telephone (404) 488-5390.

Oct. 22-25: Conference on Lead and Health, Palm Springs, California. *Contact:* J.T. Miller, Lead Industries Association Inc., 295 Madison Ave., New York, NY 10017; telephone (212) 578-4750.

Please submit calendar information to *Hazardous Substances and Public Health*, Agency for Toxic Substances and Disease Registry, 1600 Clifton Rd., NE, Mailstop E33, Atlanta, GA 30333; telephone (404) 639-0736; FTS 236-0736; fax (404) 639-0746.

Announcements

Hydrocarbon-Contaminated Soils

Scientific theory, regulatory practices, and economic interests regarding hydrocarbon-contaminated soils are often in conflict. As a result, an enormous amount of resources have been directed toward cleanup efforts. To address this situation, the University of Massachusetts is hosting "Hydrocarbon Contaminated Soils: Analysis, Fate, Environmental and Public Health Effects, Remediation, and Regulation" on September 23-26, 1991, in Amherst, Massachusetts. The goal of the Sixth Annual Conference is to develop regulations that are scientifically sound and economically rational by providing a common ground for regulatory and regulated communities to present information and debate the issues.

For more information, please contact Linda Rosen, Conference Coordinator, University Conference Services CS92-4N, 918 Campus Center, University of Massachusetts, Amherst, MA 01003; telephone (413) 545-2934; fax (413) 545-0050.

NGA Conference: Making Information Work

The National Governors' Association's fourth annual conference on integrating data for decisionmaking, "Making Information Work," will be held in Washington, D.C., January 18-23, 1992. The aim of the conference is to explore the role information plays in critical policy decisions regarding education, environment, and health.

The National Governors' Association is a public interest association representing the governors of the 50 states, the commonwealths of the Northern Mariana Islands and Puerto Rico, and the territories of American Samoa, Guam, and the Virgin Islands on issues of public policy and governance. The 1992 NGA conference will provide a forum for participants to share their experiences in applying information technology and explore ideas for leveraging the information resources of state and local government. A multidisciplinary audience of approximately 300 to 400 senior and mid-level officials from federal, state, and local government, business, and academia is expected to attend.

For more information, please contact Kristen Gooch, Making Information Work Conference, National Governors' Association, 444 North Capitol St., Suite 250, Washington, DC 20001; telephone (202) 624-5426.

Community Intervention Workshop

In conjunction with the American College of Epidemiology annual meeting November 7-8, 1991, in Atlanta, Georgia, a workshop entitled "Closing the Gap through Community Intervention" will be held November 9-10, 1991. This workshop will be jointly sponsored by the American College of Epidemiology, the Black Caucus of Health Workers of the American Public Health Association, and the Society for Analysis of African-American Public Health Issues.

The first day of the workshop, conducted at the Centers for Disease Control, may be attended for continuing medical education (CME) credit. The program will focus on planning, monitoring, and assessing interventions in communities, particularly communities of color.

The second day of the workshop, conducted at Spelman College, will include an overview of current issues in public health interventions in African-American communities by nationally known speakers.

For more information, please contact Dr. Clark Heath, American Cancer Society, 1599 Clifton Rd., NE, Atlanta, GA 30329; telephone (404) 320-3333.

Northwest Center Continuing Education

The Northwest Center for Occupational Health and Safety, located in Seattle, Washington, is one of 14 Educational Resource Centers funded by the National Institute for Occupational Safety and Health (NIOSH). The Center is offering the following continuing education programs in occupational medicine, occupational health nursing, and industrial hygiene and safety.

Supervising Hazardous Waste Operations, September 25, 1991. Training in worker protection at hazardous waste operations. Includes planning for health and safety, practical aspects of site supervision, and regulatory update. Meets federal and state requirements for 8 additional hours of specialized supervisor training. Fee: $75.

Hazardous Waste Annual Refresher Course, October 3, 1991. This course provides training on worker protection at hazardous waste operations for those who have taken the basic 40-hour course. It is designed to meet federal and state requirements for 8 additional hours of refresher training. Priority will be given to government employees. Fee: $75.

Ergonomics and the Control of Workplace Hazards, October 16, 1991. Role of ergonomic and other factors in the cause, treatment, and prevention of work-related injuries of the upper extremities and spine. A multidisciplinary approach including medical diagnosis and treatment, ergonomic work-site evaluations, and intervention strategies. Fee: TBA.

Occupational Reproductive Hazards, October 30-31, 1991. Current information on identifying, characterizing, and controlling occupational reproductive and developmental hazards. Will include basic toxicological information and risk management options. Fee: $275.

Industrial Ventilation: Principles and Applications, November 19-21, 1991. Application of ventilation principles to control airborne health hazards. Emphasis on velocity pressure method and fan system effects recommended in ACGIH Ventilation Manual. Specific design issues addressed in problem-solving sessions. Fee: $400.

For more information, please contact Janice B. Schwert, Program Manager, Continuing Education, Northwest Center for Occupational Health and Safety, Department of Environmental Health, SC-34, University of Washington, Seattle, WA 98195; telephone (206) 543-1069.

Exposure Analysis Conference

On November 18-21, 1991, the International Conference on Total Exposure Monitoring, Modeling, and Assessment will be held in Atlanta, Georgia, at the Westin Peachtree Hotel. Sponsors of the event include ATSDR, the Environmental Protection Agency, and the International Agency on Exposure Analysis.

The conference will bring together scientists, engineers, and regulatory specialists interested in human exposure and risk assessment from around the world. Technical sessions will be oriented to addressing the collection and use of human exposure data, especially the use of data for exposure assessments, risk assessments, and regulatory decisionmaking. Workshops on technical topics will be used to educate participants about human exposure monitoring and assessment.

For more information, please contact Sandee Coulberson, ATSDR, 1600 Clifton Rd., NE, Mailstop E28, Atlanta, GA 30333; telephone (404) 639-0700.

UNC Training

The North Carolina Occupational Safety and Health Educational Resource Center in Chapel Hill, North Carolina, is offering the following training opportunities during the fall of 1991.

Occupational Health Nursing: An Introduction to Basic Principles, October 2-4, 1991. This course will provide an

overview of the concepts of occupational health nursing and how to implement an effective program. The content is designed for nurses who are new to the occupational health field.

Quality Control for Industrial Hygiene Laboratories, October 7-11, 1991. This course will present strategies and structures that can be used to evaluate, control, and improve the analytical process. Lectures will be supplemented by problems and group projects. The course is designed for those with QA/QC responsibilities in the laboratory: laboratory analysts, supervisors, managers, and directors of labs accredited by the American Industrial Hygiene Association.

Asbestos Identification by Polarized Light Microscopy, October 21-25, 1991. This 4-1/2-day course is designed to teach the techniques of asbestos identification to technical personnel with little or no microscopical background. Lecture theory will be applied in "hands-on" laboratory sessions to reinforce each major concept. After the study of known samples, at least 10 hours of laboratory time will be available for analyzing unknowns.

Asbestos Respiratory Protection, October 28-30, 1991. The course is designed to provide participants with practical knowledge and hands-on experience to develop, implement, and maintain an effective respirator program. Lectures provide guidance in the selection, use, and maintenance of respirators and workshops provide hands-on experience in fit-testing.

Safety and Health Training for Hazardous Waste Site Personnel (HST 24 - HST 40). These courses, which provide 24 and 40 hours of intensive classroom instruction and hands-on training, fulfill OSHA requirements (29CFR 1910.120) as mandated under the Superfund Amendments and Reauthorization Act of 1986 (SARA). The 24-hour training is offered November 18-20 and consists of lectures, discussions, classroom demonstrations, and small group exercises. The 40-hour training, offered November 18-22, includes the 24-hour course, plus 16 additional hours of lectures, demonstrations, and hands-on training.

For more information, please contact Larry D. Hyde, Director, Continuing Education and Technical Assistance, Occupational Safety and Health Educational Resource Center, University of North Carolina, 109 Conner Dr., Suite 1101, Chapel Hill, NC 27514, (919) 962-2101.

Call for Abstracts

The Canadian Institute of Public Health Inspectors (CIPHI) and the National Environmental Health Association (NEHA) are cohosting an international environmental health conference, "Networking—Together We Succeed," in Winnipeg, Manitoba, Canada, on July 11-16, 1992. The conference will enable participants who are involved in environmental/public health to build contacts, exchange information, and discover new and practical solutions to environmental health issues.

Simultaneous tracks will be presented, including the following: General Environmental Health, Air/Land/Water, Food Protection, Environmental Health Management, Hazardous and Toxic Substances, International Environmental Health, Institutional Environmental Health, Injury Prevention and Occupational Health, and On-Site Waste Water Management. Presentations are being solicited through a

call for abstracts (100 words maximum). **The deadline for submission is October 31, 1991.**

For more information, please contact NEHA, 720 South Colorado Blvd., South Tower, Suite 970, Denver, CO 80222; telephone (303) 756-9090; fax (303) 691-9490.

Publications

EPA Groundwater Research Directory

The EPA Office of Technology Transfer and Regulatory Support (OTTRS) in the Office of Research and Development (ORD) has published the third edition of the Groundwater Technical Assistance Directory (EPA/600-9-91/006, March 1991). The directory is intended to foster communication among scientists and engineers throughout ORD and among EPA, state, and local personnel involved in the protection and management of groundwater resources. In addition to listing ORD researchers by location and subject matter, the directory provides organizational descriptions of the groundwater research programs for each ORD office.

The scientists and engineers listed in this directory conduct or manage research, development, demonstration, and technical assistance projects to support the regulatory programs of EPA's Office of Water, Office of Solid Waste and Emergency Response, and Office of Pesticides and Toxic Substances. Copies of this document are available from the Center for Environmental Research Information (CERI), Publication Order Office. Please call (513) 569-7391; FTS 684-7562.

ATSDR's 24-hour Tox Information Line (404) 639-6000

More than 100 *Toxicological Profiles* are available from ATSDR's Division of Toxicology. These documents give detailed information on many of the chemicals and substances of concern at hazardous waste sites. Each profile contains information on how a person might be exposed to the substance, possible health effects of exposure, and other scientific information.

To provide further information on the *Profiles*, including ordering information, mailing list options and qualifications or specialized technical information, the Division of Toxicology has developed a 24-hour information service. A touch-tone phone is required to use the system. The messages and fax information are updated as needed.

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HEALTH & HUMAN SERVICES
Public Health Service
Centers for Disease Control
Atlanta, GA 30333

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HAZARDOUS SUBSTANCES
A DIRECTORY OF SERVICES

Prepared
by
Illinois Department of Public Health

April 1991

Agency for Toxic Substances and Disease Registry (ATSDR)
Emergency Response Branch
Executive Park, Bldg. 31
1600 Clifton Road, NE, E-32
Atlanta, GA 30333
404/639-0615

24-hour hotline toxics information and consultation for emergency situations.

Agency for Toxic Substances and Disease Registry (ATSDR)
Toxicological Profiles Division
Executive Park, Bldg. 37
1600 Clifton Road, NE, E-29
Atlanta, GA 30333
404/639-0730

A part of the Public Health Service and based in Atlanta, Georgia, ATSDR was created by Congress to implement the health related sections of laws that protect the public from hazardous wastes and environmental spills of hazardous substances.

American Council on Science and Health (ACSH)
1995 Broadway
New York, NY 10023-5860

ACSH is a consumer education organization concerned with issues related to food, nutrition, chemicals, pharmaceuticals, lifestyle, the environment and health. ACSH is an independent, non-profit association. The nucleus of ACSH is a board of 200 physicians, scientists and policy advisors.

Canadian Centre for Occupational Health and Safety (CCOHS)
250 Main Street East
Hamilton, Ontario L8N 1H6
800/263-8276 or 416/572-2981

CCOHS is the authoritative information resource in occupational health and safety in Canada. It delivers its services through a national system of computerized information, an inquiries service and publications.

Chemical Referral Center
Chemical Manufacturers Association (CMA)
2501 M Street, NW
Washington, DC 20037
800/CMA-8200

The referral center assists in obtaining health and safety information on chemicals. CMA conducts studies, workshops and technical symposia; promotes in-plant safety and operates the Chemical Transportation Emergency Center (CHEMTREC) that supplies guidance to emergency personnel on handling transportation accidents involving chemicals.

Illinois Department of Public Health
Division of Environmental Health
Environmental Toxicology Program
525 West Jefferson St.
Springfield, IL 62761
217/782-5830

This program assesses the health effects of exposure to hazardous substances or conditions in the home, workplace or environment. Program staff also develop resource materials for physicians, other health care professionals, public health officials and citizens about health concerns related to exposure to hazardous substances or conditions. Staff also present materials and workshops to health care professionals regarding toxicology and environmental or occupational health, review and interpret chemical- and concept-specific literature and generate special reports on key environmental issues.

Illinois Environmental Protection Agency
Office of Chemical Safety
2200 Churchill Road
Box 19276
Springfield, IL 62794-9276
217/785-0830

This office provides technical support for the assessment of the effects of hazardous substances or conditions on environmental and public health. This includes reviewing Remedial Investigation/Feasibility Studies; establishing cleanup objectives or levels for hazardous waste site remediation, spills and property transfers and assisting in regulation development.

National Institute for Occupational Safety and Health (NIOSH)
Clearinghouse for Occupational Safety and Health Information
Publications Office
4676 Columbia Parkway
Cincinnati, OH 45226
513/533-8287

NIOSH publications may be requested through this office.

National Institute for Occupational Safety and Health (NIOSH)
Clearinghouse for Occupational Safety and Health Information
Technical Information Branch
4676 Columbia Parkway
Cincinnati, OH 45226
800/35-NIOSH

Provides technical support for NIOSH research programs and supplies information to others upon request.

National Pesticide Telecommunications Network (NPTN)
Texas Tech University Health Sciences Center
School of Medicine
Department of Preventive Medicine and Community Health
3601 Fourth Street
Lubbock, TX 79430
800/858-7378

The agency provides a toll-free telephone service available to address a variety of impartial information issues about pesticides to anyone in the contiguous United States, Puerto Rico and the Virgin Islands. NPTN operates 24 hours a day, 365 days a year. The program is designed to provide accurate and prompt responses to requests for information. Answers are given on the telephone or by next-day mail. It also distributes the EPA document, "Recognition and Management of Pesticide Poisonings."

National Technical Information Service (NTIS)
5285 Port Royal Road
Springfield, VA 22161
703/487-4650

NTIS distributes government documents, for example, U.S. EPA Pesticide Fact Sheets. Approximately 207 chemical-specific fact sheets are currently available.

United States Environmental Protection Agency (U.S.EPA)
National Air Toxics Information Clearinghouse
Assessment Branch, MD-13
Research Triangle Park, NC 27711

This clearinghouse serves as the focal point for information exchange about air toxics issues between federal, state and local governments. Clearinghouse information is compiled in a database and distributed via printout and hard copy reports. (Free to government agencies and nonprofit organizations.)

U.S.EPA
Planning and Community Right-to-Know Information Hotline
800/535-0202

The hotline is staffed with engineers whose primary function is responding to calls from industry and from state emergency response agencies about how to comply with Title III of the Superfund Amendments and Reauthorization Act.

U.S. EPA
Public Information Center
401 M Street, SW
Washington, DC 20466
202/382-2080

The center offers information on the agency and its programs and activities; and provides general public information concerning toxic substances.

U. S. EPA
Region V, Superfund
230 S. Dearborn St.
Chicago, IL 60604
312/886-3011

This region includes Illinois, Minnesota, Wisconsin, Indiana, Michigan and Ohio. They provide public information on such topics as hazardous wastes, air and water pollution, pesticides and drinking water.

U.S.EPA
Safe Drinking Water Hotline
800/426-4791

U.S. EPA-sponsored agency provides information for determining contamination and water quality issues.

U.S. EPA
Technical Assistance Center
Washington, DC 20466
202/554-1404

The center offers technical information concerning toxic exposures, and provides "Health Advisories" which summarize Lifetime Health Advisory Levels.